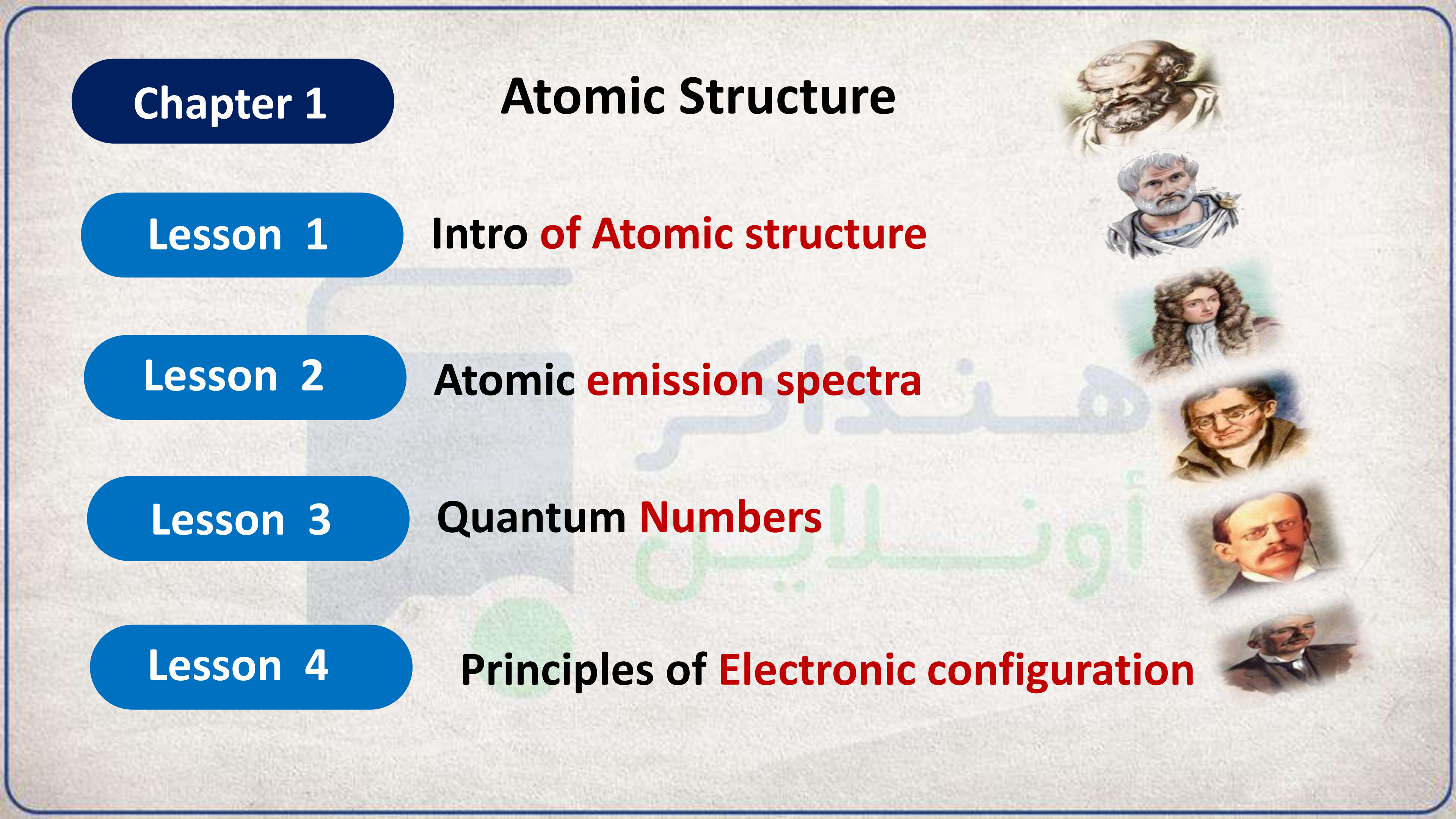
المراجعة رقم (1)









Chapter 1
Atomic Structure
Lesson 1
Intro of Atomic structure
Lesson 2
Atomic emission spectra
Lesson 3
Quantum Numbers
Lesson 4
Principles of Electronic configuration




Atomic Structure

Boyle



He gave the first definition of the Element

Stated the first theory about the Atomic Structure
&
4 Postulates & atom is indivisible solid particle



Dalton



Any matter is composed of 4 components :
water + Dust + Air + Fire

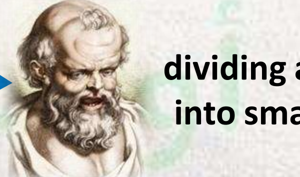
Aristotle

Atomic structure

Thomson



discovered the cathode rays &
considered the atom as a solid sphere



dividing any piece of matter into smaller parts … ATOM

Democritus



Rutherford

Gold sheet Experiment

1 Democritus' (Greek philosopher) idea

Imagined the possibility of dividing any piece of matter to smaller parts , then dividing those parts into smaller particles and so on , until reach an indivisible (indestructible) fragment is obtained, he named it an atom

2 Aristotle's idea:

He rejected the concept of the atom and believed that matter-whatever its nature is composed of 4 components , which are:

Water Air

Dust Fire

cheap metals ⟶ precious one

X

3 Boyle's idea (1661)

Rejected Aristotle's idea about the nature of matter and gave the first definition of the Element.

The element

is a pure simple substance that can't be changed to simpler forms by the traditional chemical methods.

$NaCl$ Cl_2

4 Dalton's model of the atom (1803)

Stated the first theory about the atomic structure

1. The element is composed of very minute particles, named atoms

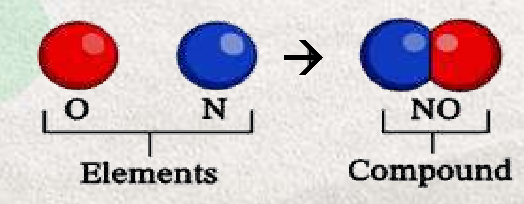
2. The atom is a very minute indivisible solid particle

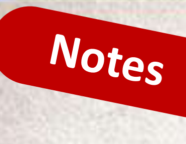
3. Masses of atoms of the same element are similar, but they differ from one element to another.

Oxygen atom

Nitrogen atom

4. The compounds are formed by the combination of atoms of different elements in simple numerical ratios.

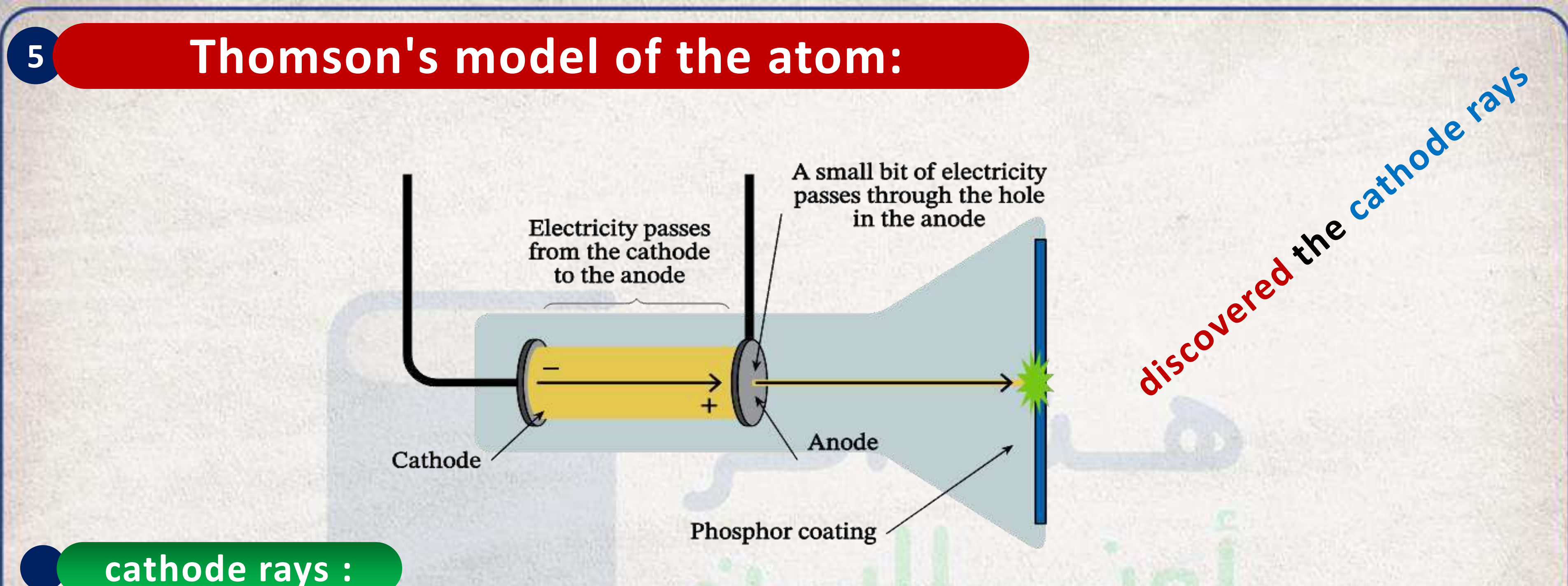




isotopes

Are different forms of atoms of the same element which have same atomic No but different mass No.

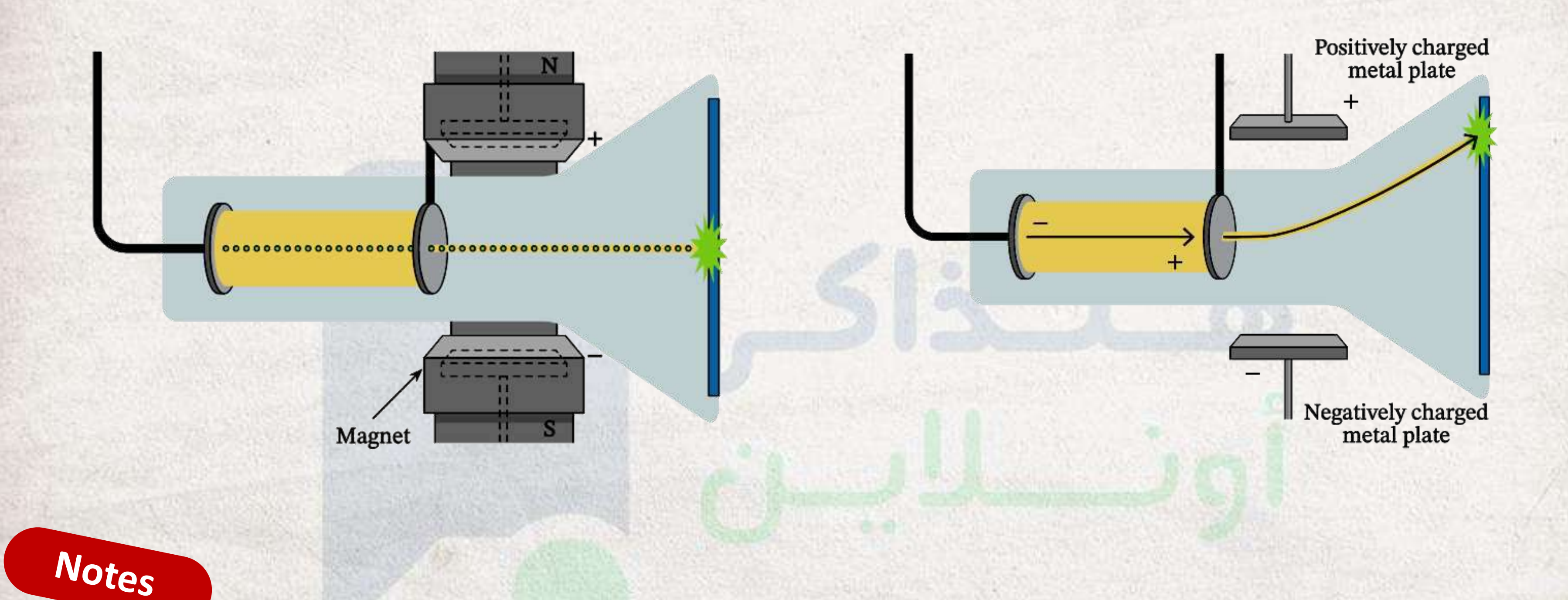
5 Thomson's model of the atom:



cathode rays :

A stream of invisible rays was emitted from the cathode causing a **fluorescent glow** on the tube wall

Properties of cathode rays



Notes

They don’t differ in nature or behavior if the material or the gas has changed & This is a prove that ………………………..



atom is a solid sphere of uniform positive charges in which a No of negatively charged electrons is embedded to make the atom electrically neutral

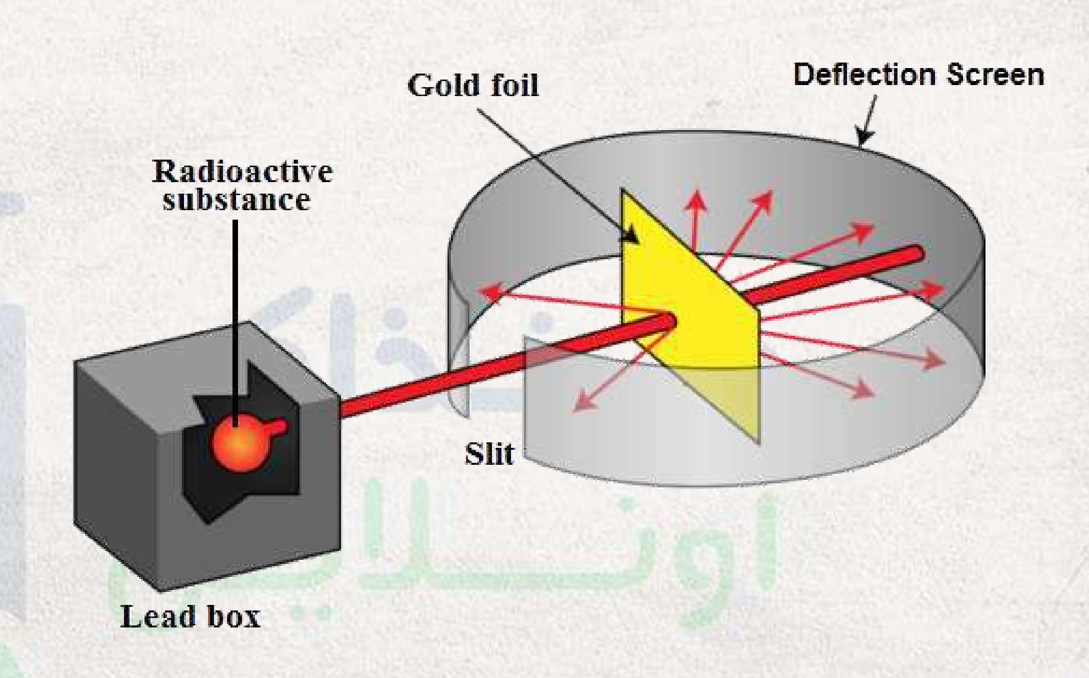
Electrons

Sphere of
positive charge

6 Rutherford's model of the atom (1911)

The postulates

1. Atom
2. Nucleus
3. Electrons





ZnS is used to detect the invisible alpha particles, as they glow at the positions where they collide with this substance



Conclusion

Neutrons

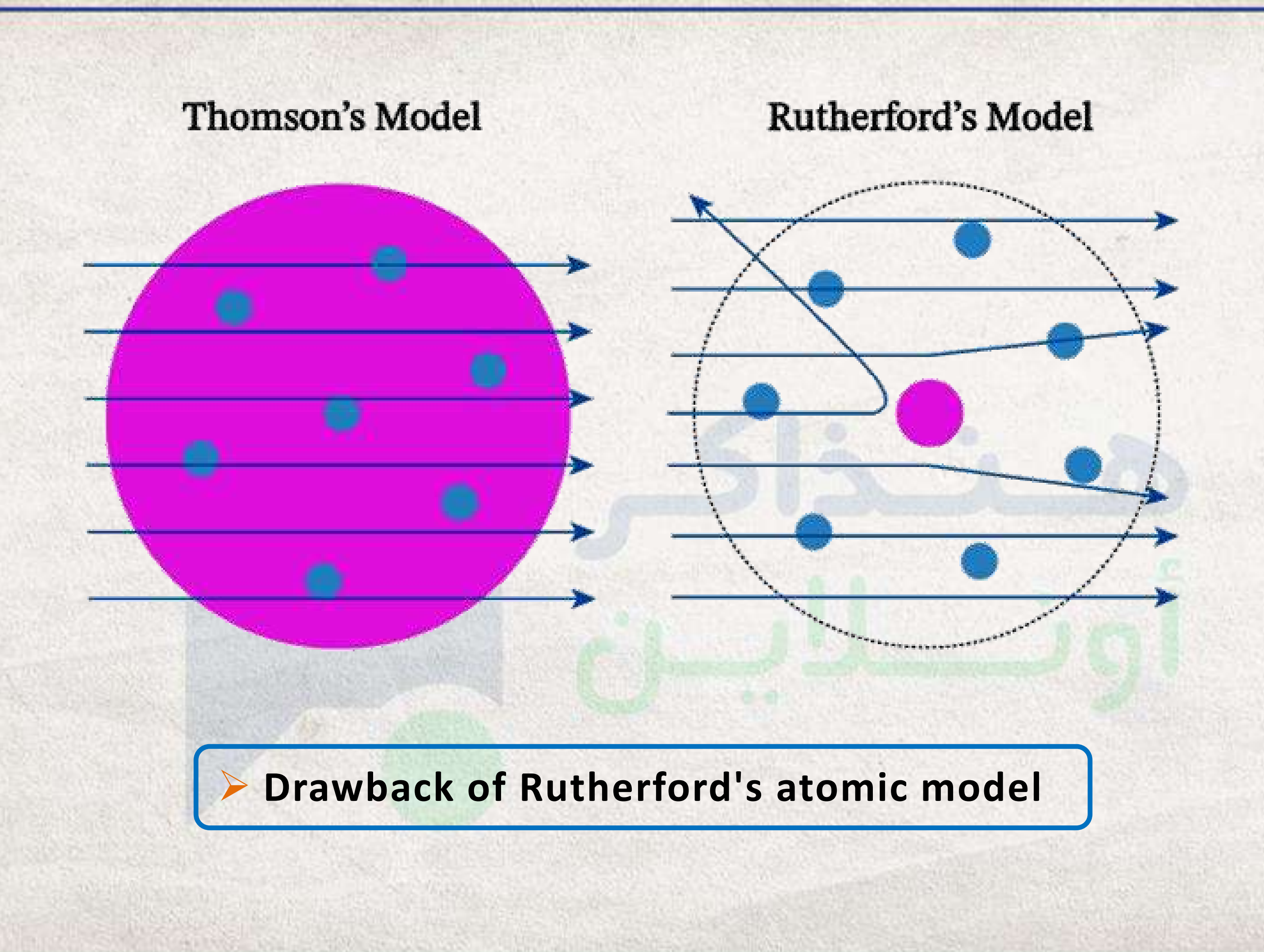
They are not deflected (continue in a straight line), as they are

Protons

They are deflected towards the negative electrode, as they are

Electrons

They are deflected towards the positive electrode


Thomson's Model
Rutherford's Model
Drawback of Rutherford's atomic model

Atomic emission spectra

A On heating atoms of a pure element- in gaseous or vapor state to high temp or expose it to low pressure in an electrical discharge tube, they emit a radiation which is called line spectrum

B was found that it is composed of a limited number of restricted colored lines separated by dark areas



There is no elements have the same line spectrum,

this is due to the difference in the atomic number (number of protons) from one element to another.

The line spectrum of hydrogen atom

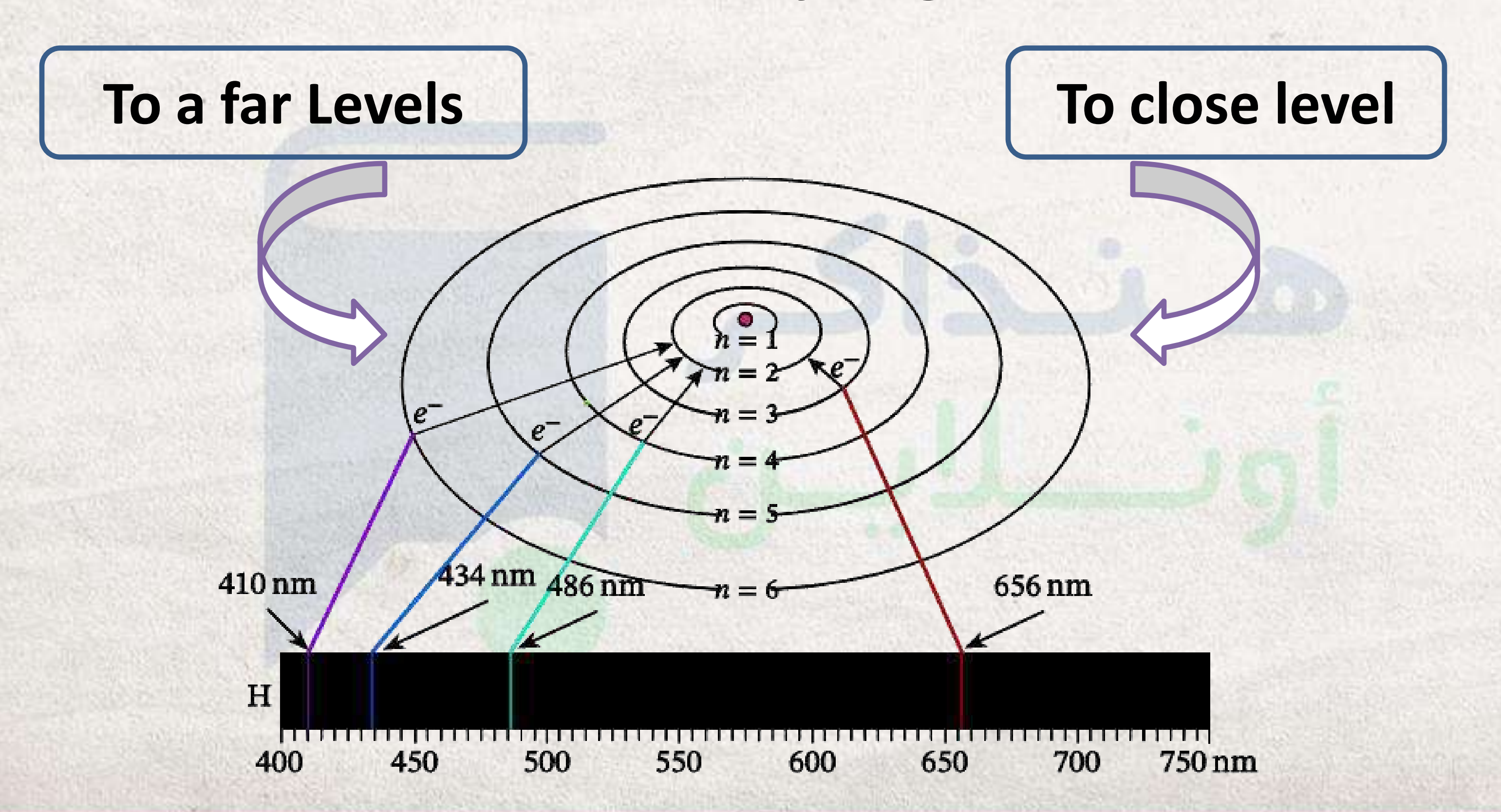


Visible line spectrum of hydrogen atom consists of **4 colored lines**

Excited hydrogen sample
Slit
Prism
Detector
Emitted wavelengths
410
434
486
656
Wavelength, λ (nm)

Notes

➢ If the Return of Electron of hydrogen atom from one level



7 Bohr's atomic model (1913)

The study of atomic spectra is considered the key which solved the puzzle of the atomic structure





A Agree with Rutherford's postulates

B Made a new postulates

Bohr's postulates

1. Electrons orbit the nucleus in a rapid movement **without** emission or absorption of any amount of energy and the atom in this case is named **stable atom.**

2. Electrons orbit the nucleus in definite allowed energy levels. They **cannot** be found in the regions between these levels, where the electron moves from an energy level to another one via a **complete Jumping.**

3. Each electron in the atom has a definite amount of energy **depending on the distance between its energy level and the nucleus**, the energy of any level **increases** as its radius increases.



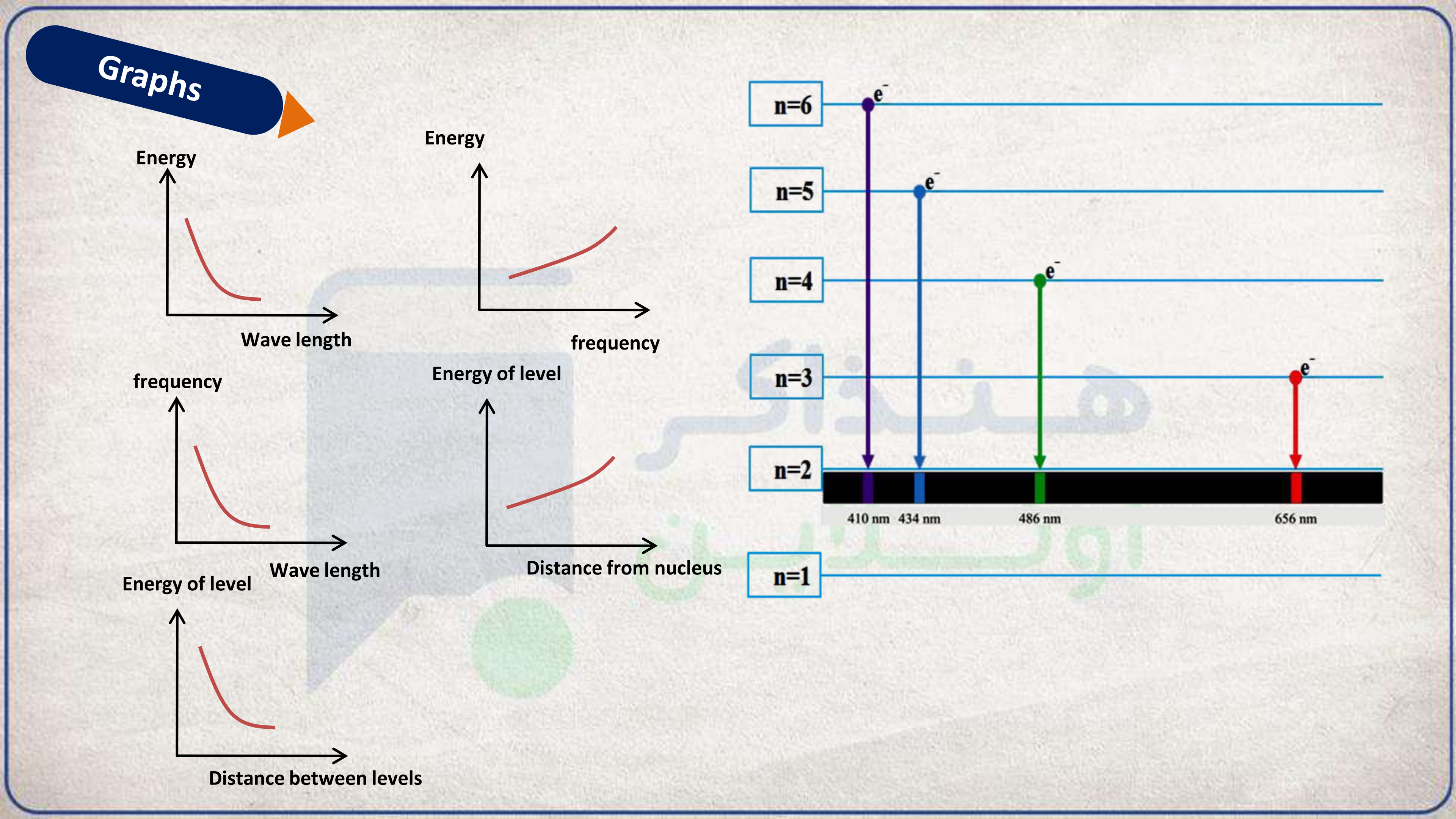
Bohr's postulates

4. Each energy level is expressed by an integer Number called the principal quantum number (n)

5. The electron revolves in the lowest allowed energy level in its ground state

6. When the electron acquires a quantity of energy- known as quantum-by heating or by electric discharge, the electron jumps temporarily to higher energy level

electron orbits
electron
proton
neutron


Graphs
Energy
Wave length
Energy
frequency
frequency
Wave length
Energy of level
Distance from nucleus
Energy of level
Distance between levels
n=6
n=5
n=4
n=3
n=2
n=1
e-
e-
e-
e-
410 nm
434 nm
486 nm
656 nm

Notes

- Line spectrum of sun rays shows that composed of hydrogen & Helium.

Series	Electron transfer		Spectrum region
	From (n)	To (n)	
First	2 , 3, 4 , ……….	1	Ultraviolet (invisible)
Second	3 , 4, 5 , ……….	2	spectrum visible
Third	4 , 5, 6 , ……….	3	Infrared (invisible)
Fourth	5 , 6, 7 , ……….	4	

✓ The transference of the excited electron in hydrogen atom to its original energy level is accomplished by one jump or several successive Jumps.

Remarks

1 The quantum

the amount of energy gained or lost when an electron jumps from one E. level to another.

2 The difference in energy between levels (Q) is not equal difference in this energy decreases further from the nucleus.

➢ **This means :**

The quantum of energy required to transfer an electron from one energy level to another is not equal.

3 The electron does not move from its level to another unless the energy absorbed or emitted is equal to the difference in energy between 2 levels (one quantum)

The advantages of Bohr's atomic model:

1. It explained hydrogen atom spectrum.
2. He introduced the idea of quantum no to detect energy of electrons in energy levels.
3. He proved that electrons during rotation around the nucleus in ground state do not radiate energy, so they will not fall back to the nucleus

The drawbacks of Bohr's atomic model

Particle-like behavior

Wave-like behavior

Electron

Circular orbit
(Bohr model)

Charged density distribution
(model of wave mechanics)

The principles of Modern Atomic Theory

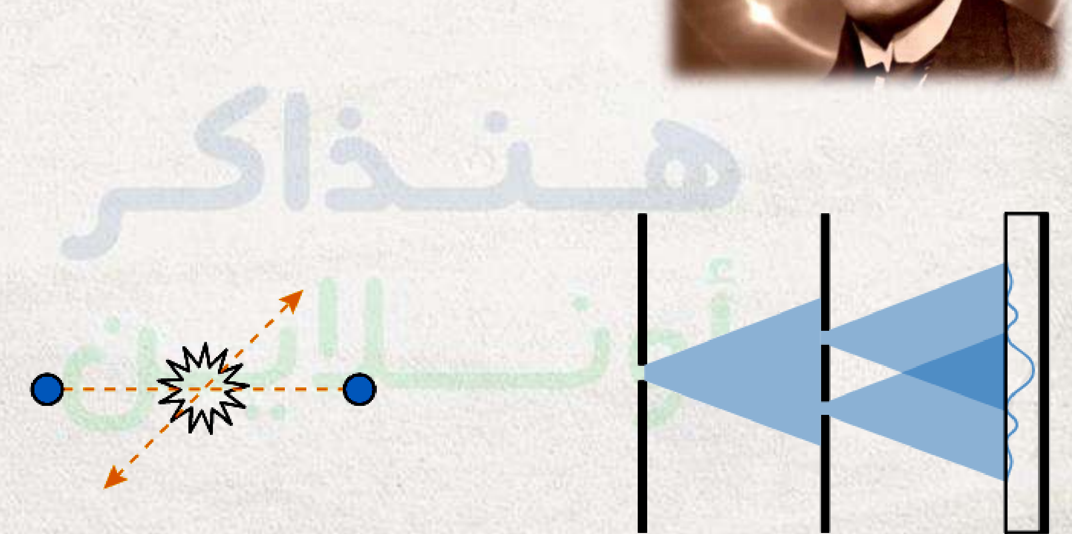
1. Dual nature of electron.
2. Heisenberg uncertainty principle.
3. The wave-mechanical theory of the atom

1 The dual nature of the electron

The experimental data showed that the electron has a dual nature

A) It is a material particle

B) It has wave properties.



Particle-like behavior

Wave-like behavior

2 The Heisenberg uncertainty principle



- Bohr postulate that we can determine the position and velocity of electron **(X)**

- It is practically impossible to determine both position and the velocity

3 The wave-mechanical theory of the atom



❖ **Schrodinger** applied shows by the wave equation that applied to the electron movement:

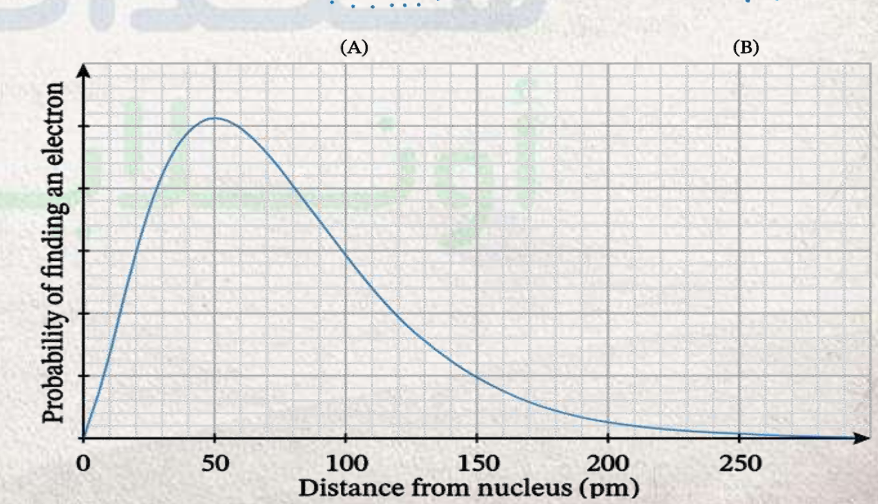
1. It is possible to determine the allowed energy levels of the electron
2. Define the region of space around the nucleus where it is most probable to find the electron in each energy level.

Electron Cloud

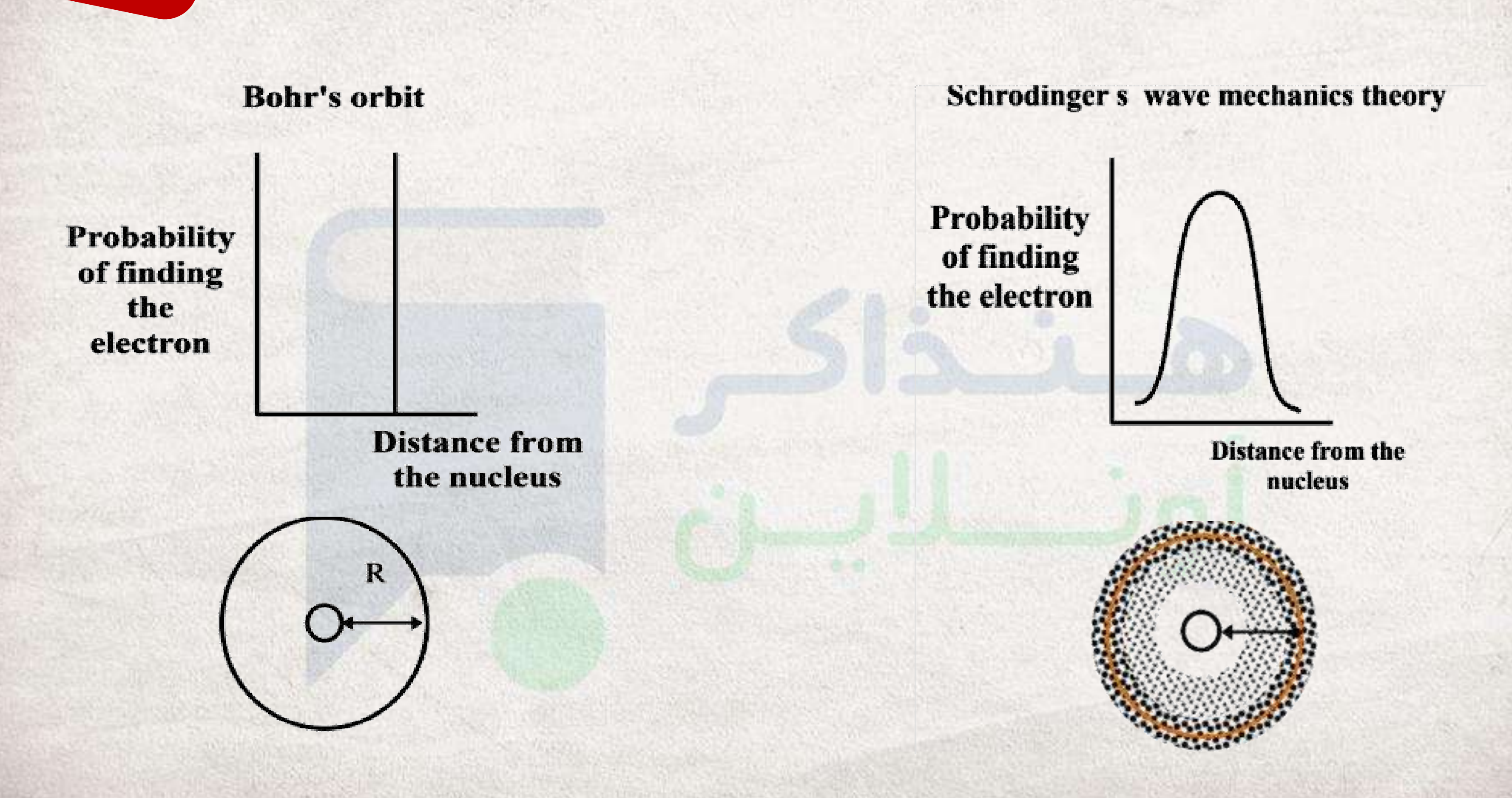
Area of space around the nucleus where there **is a great probability** for finding electrons in all direction and all positions

Orbital

Region inside the electron cloud, in which the **possibility of presence of electron increases**



Note



Bohr's orbit
Probability of finding the electron
Distance from the nucleus
R
Schrodinger s wave mechanics theory
Probability of finding the electron
Distance from the nucleus

Quantum numbers

1 The principal quantum number (n):

It describes the distance of the electron from the nucleus. (7)

The rule $2n^2$ isn't applied to the energy levels higher than the fourth level



Quantum numbers

2 The subsidiary quantum number (ℓ):

It describes the shapes of electron cloud in the sublevels.

$(2\ell + 1)$

values which range between [0: (n-1)]



Quantum numbers

3 The magnetic quantum number (m_ℓ):

It describes the shape and number of the orbital in which the electron exists.

$$(-\ell..., 0.....+\ell)$$



Quantum numbers

4 The spin quantum number (m_s):

It describes the spin motion of the electron.

1-Clockwise (↑) with m_s value equals ($+\frac{1}{2}$)

2 - Anticlockwise (↓) with m_s value equals ($-\frac{1}{2}$)



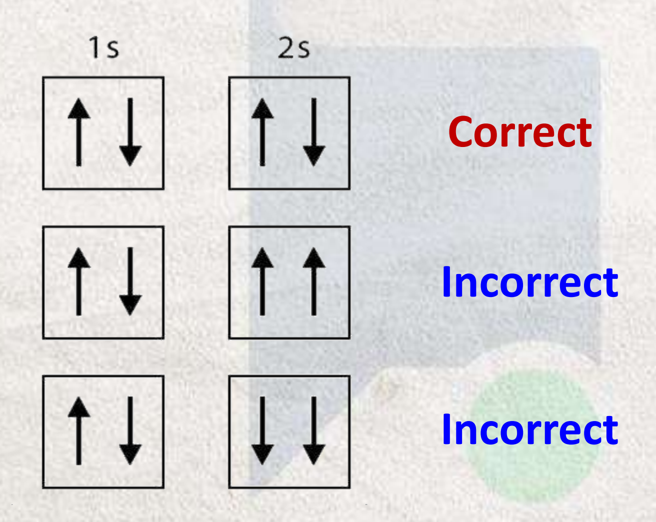
Principles of distributing electrons

1. **Pauli's exclusion principle.**
2. **Building-up principle**
3. **Hund’s rule.**

Principles of distributing electrons

1 Pauli Exclusion Principle

No two electrons can have the same set of quantum numbers

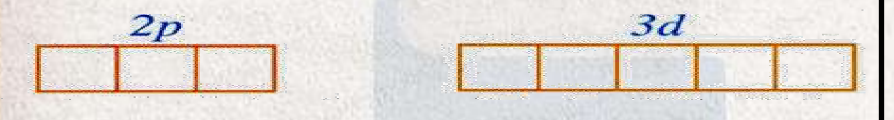


2 Building up Principle

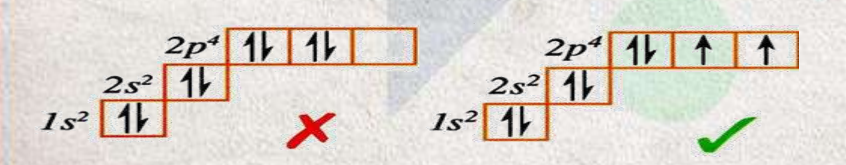
3 Hund's rule

No electron pairing takes place in a given sublevel until each orbital contains one electron.

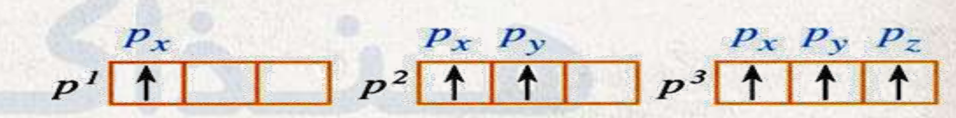
1 The orbitals of the same sublevel are equal in their energy



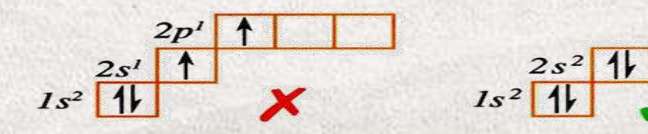
3 Electron pairing takes place in the orbitals of the same sublevel after occupying all orbitals by unpaired electrons first

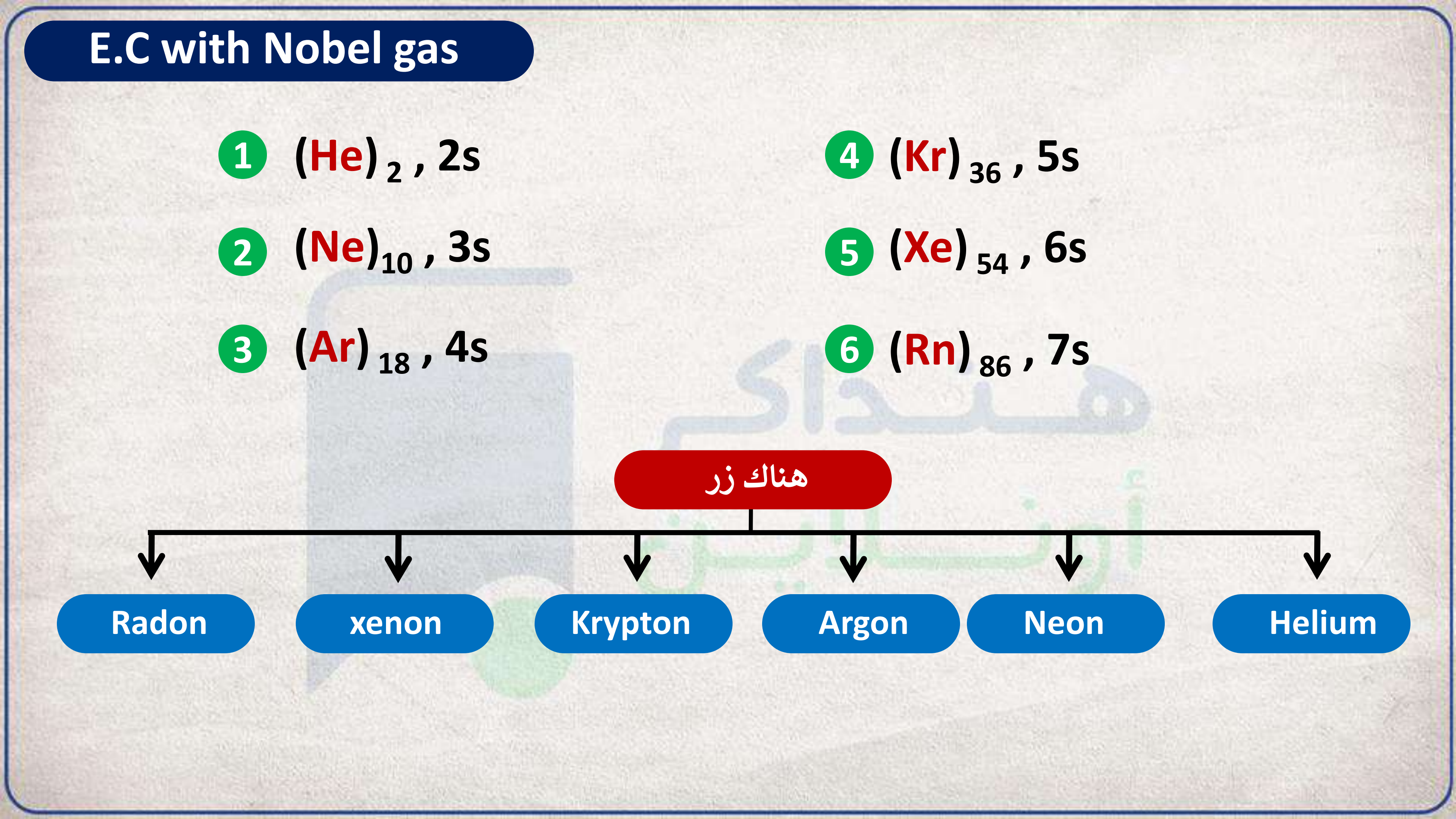


2 The orbitals of the same sublevel are filled successively by the unpaired e,s firstly (the spinning of e,s in the same direction)

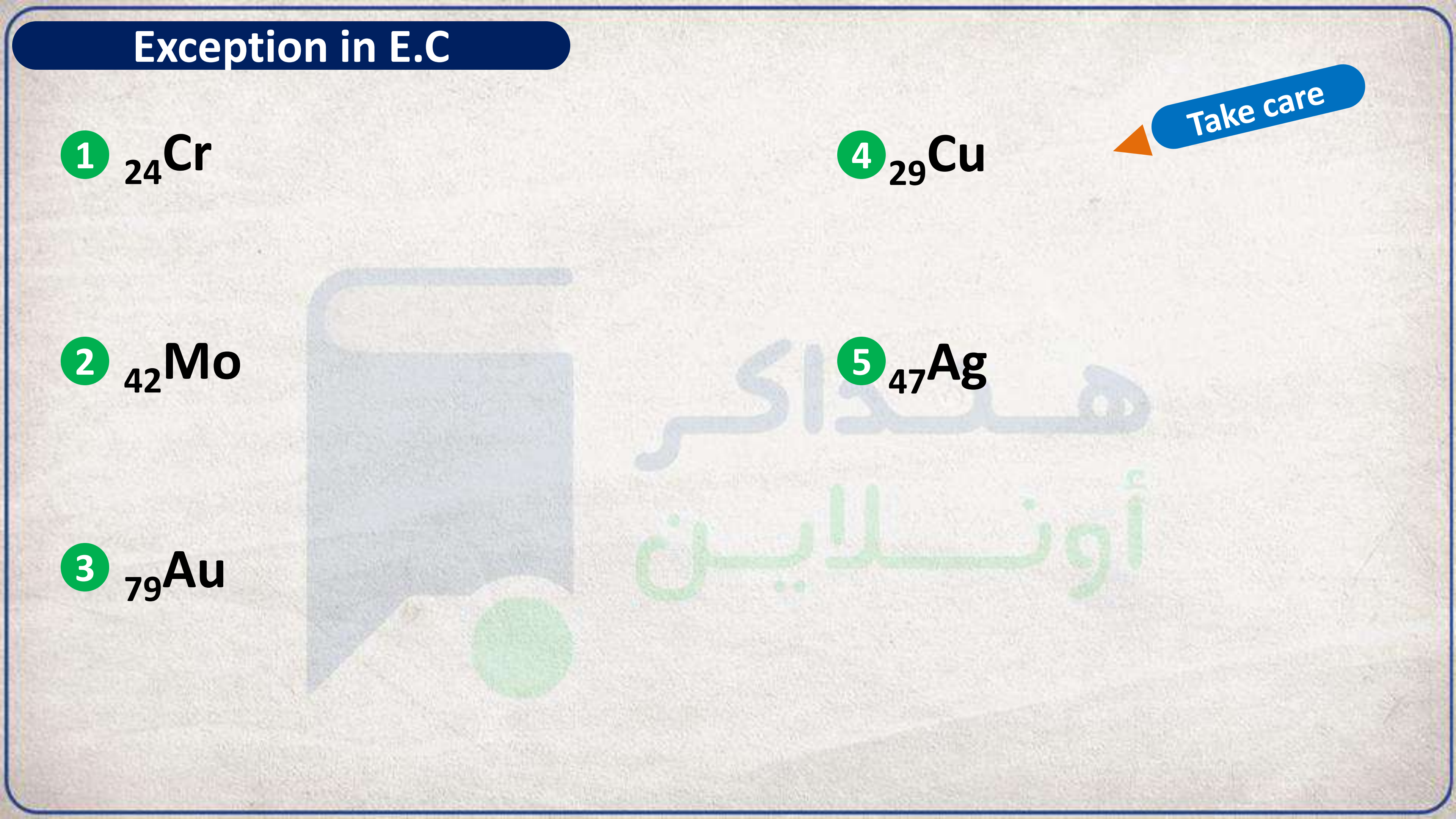


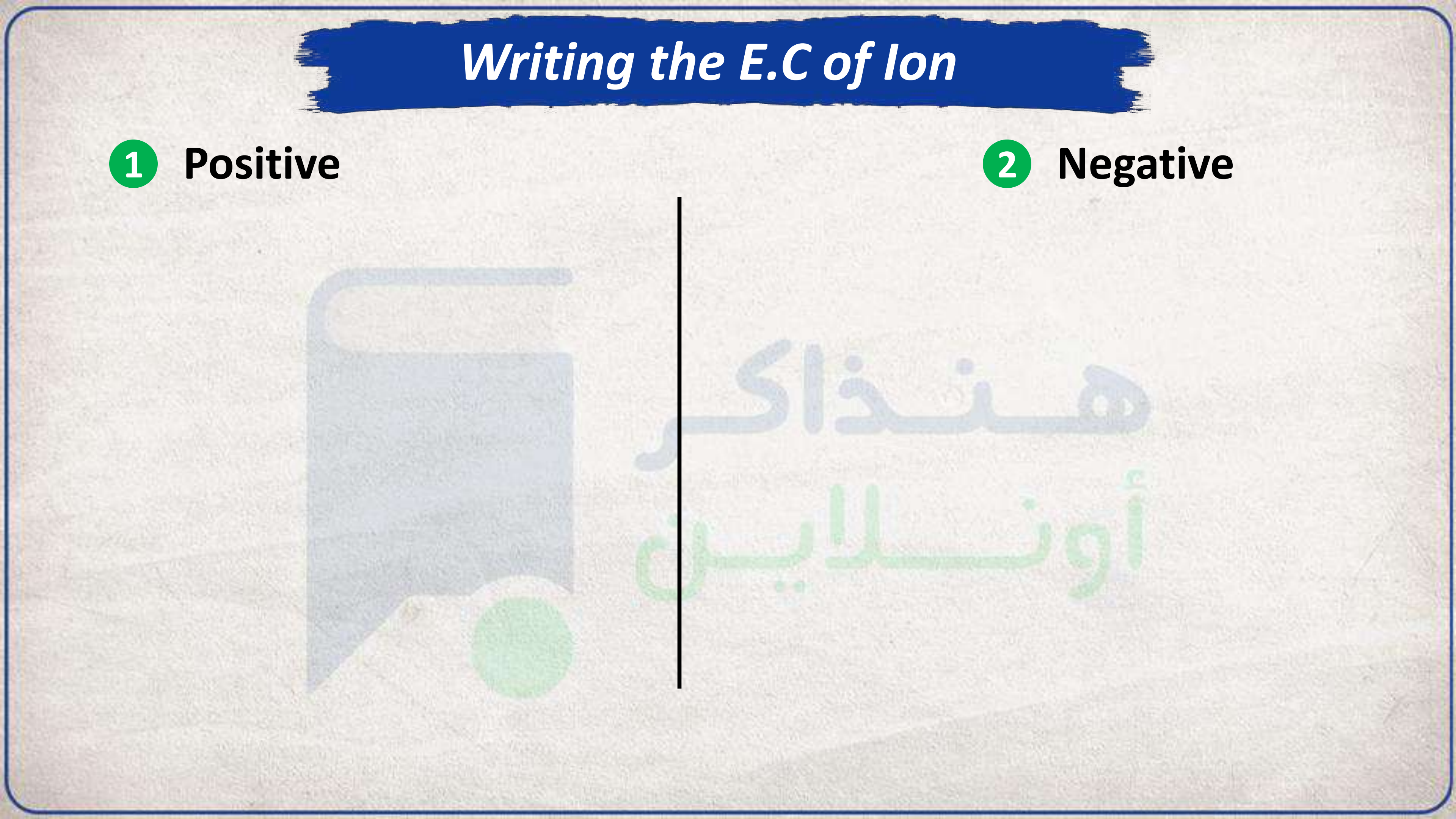
4 The electrons prefers to be paired with another electron in one orbital of the same sublevel rather than being transferred to higher E.L





E.C with Nobel gas
1 (He) 2 , 2s
2 (Ne)10 , 3s
3 (Ar) 18 , 4s
4 (Kr) 36 , 5s
5 (Xe) 54 , 6s
6 (Rn) 86 , 7s
هناك زر
Radon
xenon
Krypton
Argon
Neon
Helium


Exception in E.C
Take care
1 $_{24}Cr$
2 $_{42}Mo$
3 $_{79}Au$
4 $_{29}Cu$
5 $_{47}Ag$



Writing the E.C of Ion
1 Positive
2 Negative
هنذاكر
أونلاين



The idea of : that substance (X) is composed of 25% water, 10% dust , 50 % air and 15 % fire is related to…… idea

- Bohr’s
- Aristotle’s
- Dalton’s
- Rutherford



The orbitals in the same sublevel are different in

- Energy
- Principle Q.No
- Magnetic quantum number
- Subsidiary quantum number



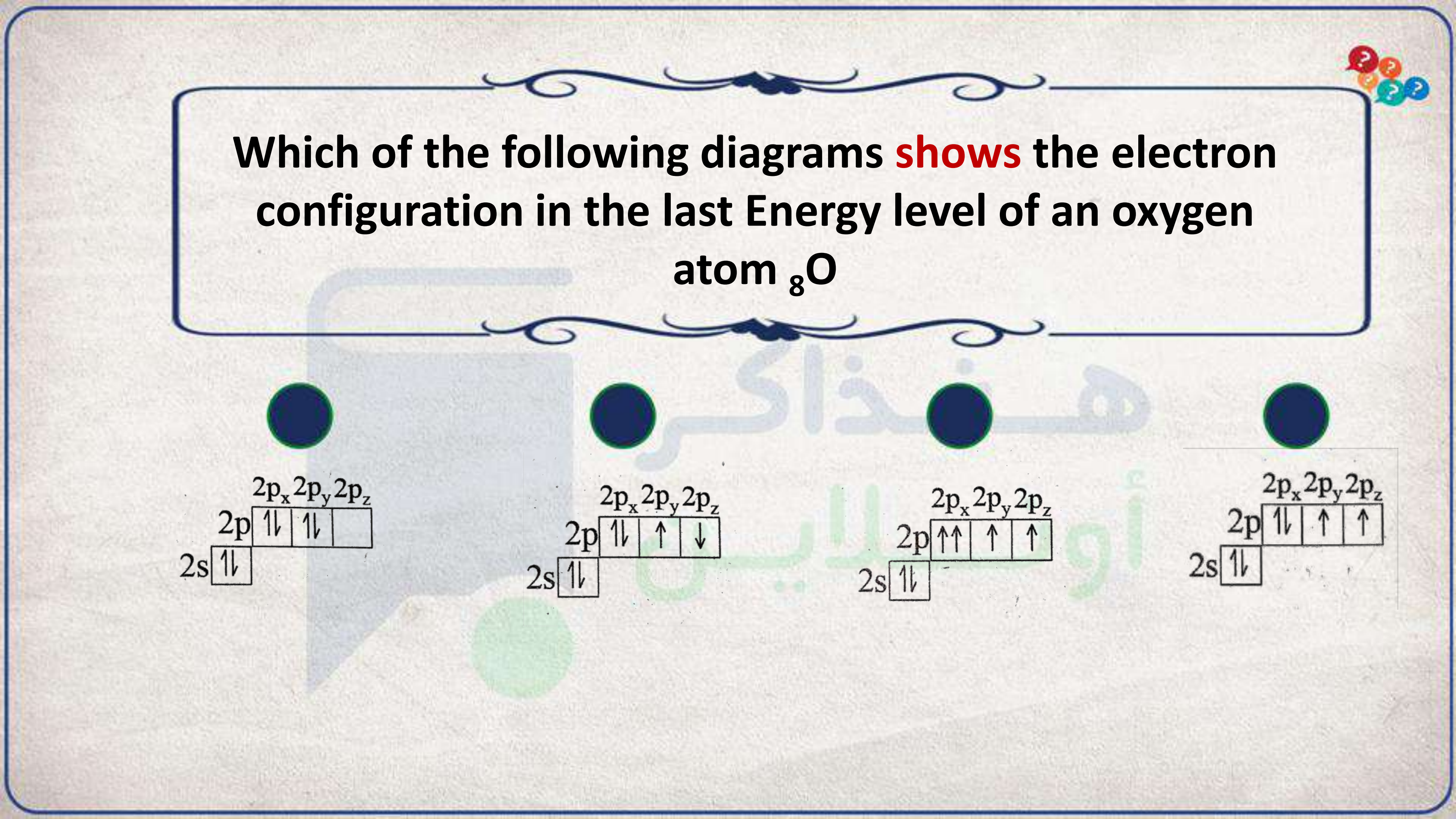
if the four quantum numbers of the last electron in divalent element is
[$n=3$, $\ell=1$, $m\ell=-1$, $ms=-½$] So , the atomic number of this element is

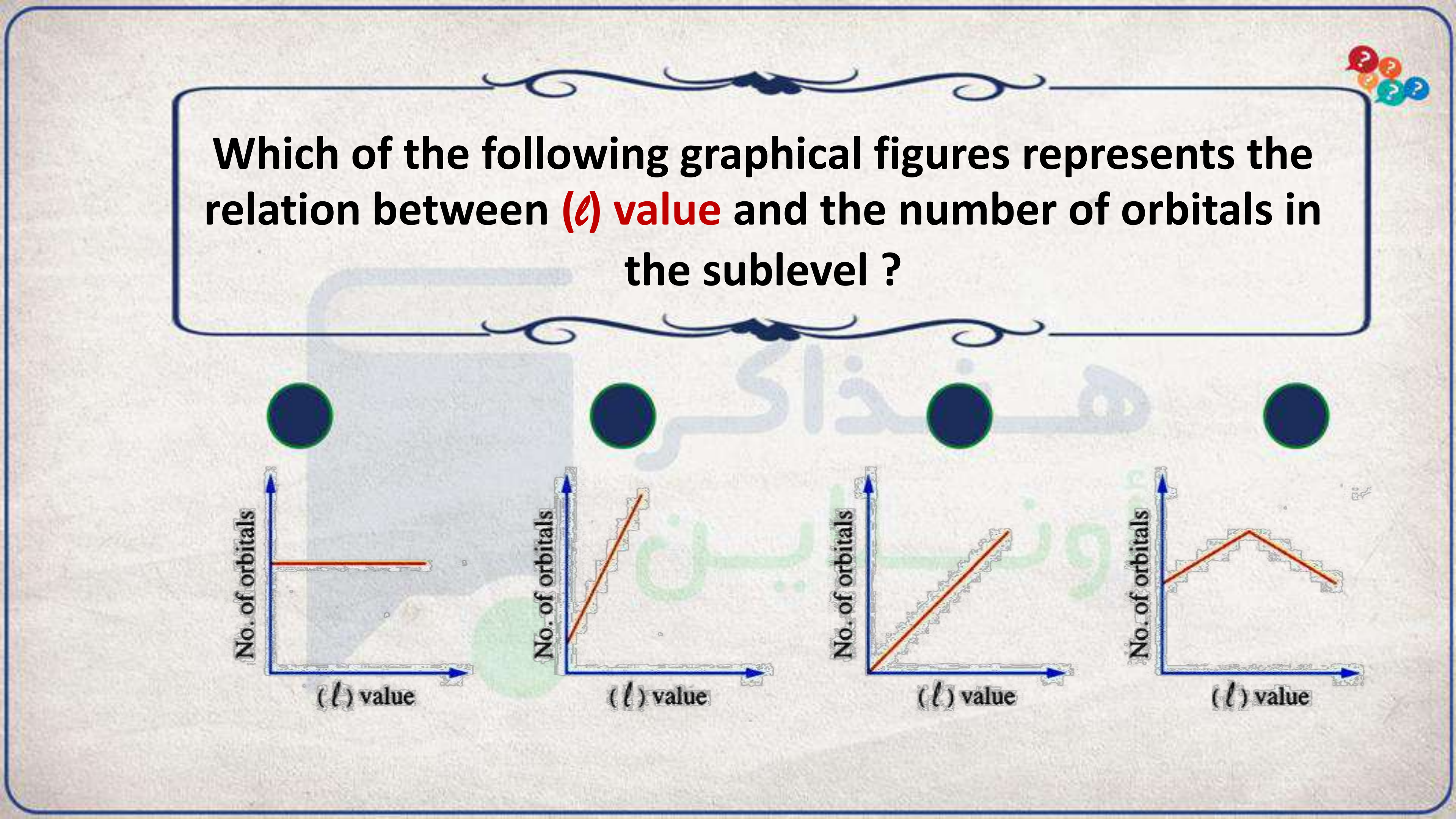
- 10
- 12
- 20
- 16



The electrons of 5d sublevel in one of the atoms cannot have the magnetic quantum number

- +1
- -1
- +2
- +3


Which of the following diagrams shows the electron configuration in the last Energy level of an oxygen atom $_8O$
2p$_x$ 2p$_y$ 2p$_z$
2p ⇅ ⇅
2s ⇅
2p$_x$ 2p$_y$ 2p$_z$
2p ⇅ ↑ ↓
2s ⇅
2p$_x$ 2p$_y$ 2p$_z$
2p ↑↑ ↑ ↑
2s ⇅
2p$_x$ 2p$_y$ 2p$_z$
2p ⇅ ↑ ↑
2s ⇅



Which of the following graphical figures represents the relation between (ℓ) value and the number of orbitals in the sublevel ?
No. of orbitals
(ℓ) value
No. of orbitals
(ℓ) value
No. of orbitals
(ℓ) value
No. of orbitals
(ℓ) value



Which of the following represents the electronic configuration of the atom of gallium $_{31}Ga$ in its excited state ?

- 2 , 8 , 17 , 3
- 2 , 8 , 17 , 4
- 2 , 8 , 18 , 3
- 2 , 8 , 18 , 4



Which of the following represents the sublevels from which the electrons are **lost** when the atom of the element $_{21}Sc$ is converted to M^{3+} ion ?

- 3s , 4s
- 4s , 3d
- 3d ,4p
- 4s , 4p



The last sublevel in X^{3+} ion is $2p^6$ What is the number of the half filled orbitals in the atom of X ?

- Zero
- 1
- 2
- 3



according to Heisenberg ………….. is right

- it is possible to determine the location and the speed of electron around the nucleus precisely
- it is possible to determine the location or the speed of electron around the nucleus .
- speak in terms of probability is nearer to right
- no correct answer



The N<u>o</u> of electrons that have a **magnetic** Q.N<u>o</u> (m_ℓ = -1) in $_{20}$Ca is

- 4
- 6
- 9
- 12



the **excited** atom is the atom that gain amount of energy by ………………

- electric discharge
- heating
- ionization
- a, b



in the light of our concept about atomic structure so, one of the following postulates considered **wrong** ?

- atomic mass concentrated in the nucleus
- the spaces between energy levels is forbidden to electrons
- electrons revolve around the nucleus without lose or gain energy .
- the energy of electron increases as we go further from the nucleus



the orbitals of 3P sublevel are **similar** in …………………

- shape
- energy
- capacity of electrons
- all of the previous



if the sublevel which has ($n=3$, $\ell = 2$) contains 8 electrons so, the number of its **half filled** orbitals is .....

 1

 2

 3

 5



from the bohr's theory postulates

……………………

- electrons revolve around nucleus in fixed circular orbits equal in energy
- electrons revolve around nucleus in fixed circular orbits different in energy
- during revolving electrons around the nucleus it loses energy gradually
- no correct answer



What is the atomic No of the element that it's third principle level contains double the No of electrons in the second principle level

- 26
- 28
- 36
- 18



Bohr atomic model can be used in explaining the line spectrum of ……….

- $_1H$
- $_2He$
- $_3Li^{+2}$
- all of the previous



The $_{8}O^{-2}$ ion contains.....

- 8 protons, 10 electrons
- 8 protons, 9 electrons
- 10 protons, 7 electrons
- 10 protons, 8 electrons



…………. Discover the **nucleus of atom .**

- Rutherford
- Thomson
- Dalton
- Democritus



Which choice represents the quantum number of the last electron in the fluorine atom $_{9}F$

- $n = 2, \ell = 1, m_\ell = -1, m_s = -1/2$
- $n = 2, \ell = 1, m_\ell = 0, m_s = -1/2$
- $n = 2, \ell = 1, m_\ell = 1, m_s = +1/2$
- $n = 2, \ell = 0, m_\ell = 1, m_s = +1/2$



Bohr's atomic model is distinguished from Rutherford's model in that the electrons orbit the nucleus in Bohr's model in:

- Special orbits.
- allowed energy levels.
- That they revolve around the nucleus.
- That they revolve at very high speed



The modern atomic theory modified the **inadequacy** in Bohr's atomic model by ....

- The electron has wave property only
- The electron is negative material particle only
- The electron orbits the nucleus in electron cloud
- The electron has a dual nature



What is the rule or the principle which explains this mistake ?

- Pauli's exclusion principle
- Aufbau principle
- Hund's rule
- uncertainty principle

$1s^2, 2s^2,$ [↑↓][↑↓][ ]

$2p$



To get visible spectrum of the hydrogen atom of electron exited at the third energy level (M) must …….

- The electron lose energy less than energy gain
- The electron lose energy more than energy gain
- The electron gain a quantum of energy
- The electron lose energy same than energy gain



The strong evidence that proved that cathode rays exist in all matters ……………..

- They have thermal effect
- flow in straight lines
- consist of fine particles.
- they have the same properties and behavior whatever the gas or the cathode material used



the ratio between the required number of electrons to saturate the level L and the number of electrons required to saturate the level N .....

- 1 : 1
- 2 : 1
- 1 : 3
- 1 : 4



When oxygen gas is exposed to high temperature or low pressure, which of the following is right ……….

- **Nuclear separation of the gas occurs.**
- **A distinctive radiation of oxygen gas is released**
- **The gas molecules are not affected**
- **Light is emitted, called a continuous spectrum**



All of the following are characteristics of a linear spectrum **except** ……………

- The line spectrum of a hydrogen atom consists of four continuous colors
- The line spectrum of hydrogen differs from the line spectrum of helium
- It is produced when the excited atoms return to their stable state
- It results when an electron moves from a higher energy level to a lower energy level



When an electron gains half a quantum of energy, it will...

- moves to a higher energy level
- moves to a lower energy level
- It remains at the same energy level.
- There is no correct answer



By studying the atomic spectrum, it is possible to know ....

- The element only
- The energy levels only
- he composition of the nucleus
- The element and the energy level



When an electron in a hydrogen atom is excited to the fourth level, the number of possible jumps that result in a visible spectrum is ....

- 1
- 2
- 4
- 3



Both Rutherford and Thomson agree that the carbon atom …………….

- electrically neutral
- contains negative electrons.
- It has no spaces.
- homogeneous ball.



The corresponding particle (M) may be …….

- neutron
- electrons
- Protons
- alpha particles

+
-
M
A
Z



All gases in normal conditions of temperature and pressure are ……..

- electric insulator
- electric conductor
- ionized
- all of the previous



The scientist who assume the **first** theory about the atomic structure ………

- Rutherford
- Thomson
- Aristotle
- Dalton



All the following are from the properties of cathode ray **except** ……….

- Have a thermal effect
- Move in straight line
- have a positive charge
- Affected by electric and magnetic field



Which of the following can exist cathode ray ....

- Under normal conditions of temperature and pressure
- under high pressure and high potential difference
- under low pressure and suitable potential difference
- All the previous answers are correct



the scientist ………… put the solid atomic model .

- Rutherford
- Thomson
- Dalton
- b, c



The scientist who assume the first theory about the atomic structure experimentally

- Rutherford
- Schrödinger
- Bohr
- brezelius



The scientist who discovered the cathode ray ……….

- Boyle
- Dalton
- Rutherford
- Thomson



deviation of alpha particles in Rutherford experiment proved that ……… exist in atom .

- electrons
- spectrum
- neutrons
- positive nucleus



The Next figure represents the path of a beam of a-particles between two metal sheets in vacuum conditions. What happens to the reading of the sensitive instrument upon charging the two metal sheets **with different charges** ?

- It does not change
- It increases
- It decreases
- It increases for a period of time. then It returns to the initial reading

Metal sheet

α - particles

Source of α - particles

Sensitive instrument to detect number of α - particles

Metal sheet



Atom of element (X) 3p sublevel is **half-filled** , so the number of orbitals occupied by electrons is.....

- 7
- 8
- 9
- 6



Which of the following are **not** deflected by the effect of the charged plates?

- Cathode rays.
- Alpha particles
- Protons
- Hydrogen atoms.



The correct electronic configuration of the bromide ion ($_{35}Br^{-}$) is ………………….

- [Ar] $4s^2, 3d^9, 4p^6$
- [Ar] $4s^2, 3d^{10}, 4p^5$
- [Ar] $4s^2, 3d^{10}, 4p^5, 5s^1$
- [Ar] $4s^2, 3d^{10}, 4p^6$



The scientist who ……….. said that the atom looks like the solar system .

- Rutherford
- Bohr
- Dalton
- Boyle



the studying of the atomic spectrum of hydrogen atom is the key which makes bohr knows ……….

- electrons negatively charged
- atom has central nucleus
- energy levels of atom
- all of the previous



All the following sets of quantum numbers is possible , except ....

- $n = 2 , \ell = 0 , m_\ell = +1$
- $n = 2 , \ell = 0 , m_\ell = 0$
- $n = 2 , \ell = 1 , m_\ell = -1$
- $n = 2 , \ell = 1 , m_\ell = +1$



What is the No of electrons exist in f sublevel when the sum of spin quantum No is 2.5

- 7
- 8
- 9
- 14



The spectral line of hydrogen atom consists of 4 colored lines.

Which of these lines has the highest frequency?

- Green
- Blue
- Red.
- Violet.



if the electron absorbs a quantum of energy **it transfers to** ……………….

- any higher energy level
- any lower energy level
- higher energy level correspond to the absorbed quantum
- lower energy level correspond to the absorbed quantum .



when electron transfer from the first energy level to the fourth energy level .

- 4 quantum
- 3 quantum
- 2 quantum
- 1 quantum



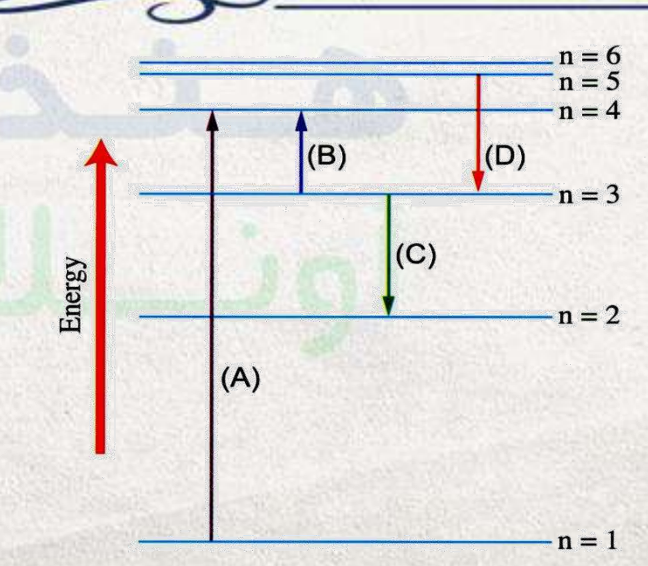
The opposite figure illustrates some travels of the electron of an excited hydrogen atom between the different energy levels. Which of these travels produces a spectral line of hydrogen atom?

 A

 B

 C

 D





Which of the following transfers of the electron of hydrogen atom is accompanied by releasing the largest amount of energy ?

- n=4 → n=2
- n=5 → n=4
- n=2 → n=1
- n=4 → n=3



the visible line spectrum of hydrogen produced due to return excited **electrons to the energy level** …………….

 K

 L

 M

 N



when excited electrons return to its original levels it emits……

- alpha particles
- beta particles
- energy in a form spectral lines
- gamma rays



Bohr's atomic model can be applied to

[Na = 11 , He =2 , Be = 4 , C = 6]

- Na^{+10} ion
- He atom.
- Be^{+2}ion
- C^{+6} ion.



the amount of energy needed to transfer electron from the second level to the third level ………………. the amount of energy needed to transfer electron from the third level to the fourth level .

- more than
- less than
- equal
- no correct answer



which of the following has **the same** energy in the same atom ?

- 2S , 3S
- 2S , 2P
- $2P_x$, $2P_y$
- $3P_x$, $4P_z$



the number of orbitals in the principle energy level (n) equal………

- n
- n^2
- $2n^2$
- $2\ell +1$



the number of electrons in the principle energy level (to the fourth) equal ……

- n
- n^2
- $2n^2$
- $2\ell +1$



the number of orbitals in the energy **sublevel equal ....**

- $2(2\ell + 1)$
- n^2
- $2n^2$
- $2\ell + 1$



No. of electrons which saturate the sublevels ....

- $2(2\ell + 1)$
- n^2
- $2n^2$
- $2\ell + 1$



If the electrons gains energy equal **10.2 ev** it transfer from level (**k**) to level (**L**) So, the difference in energy between the level (**M**) and the **level (L)** is .....

- 1.9 ev
- 15.1 ev
- 10.2 ev
- 20.4 ev



The approximate probable percentage of the possibility of determining the position and the speed of an electron whose mass is 9.1×10^{-31} kg together precisely is

- 0.0001 %
- 0.01 %
- 0.1%
- 1%



What is the maximum number of electrons which have the spin quantum number ($m_s = +1/2$) in the sublevel ($\ell = 3$) ?

- 3
- 5
- 7
- 14

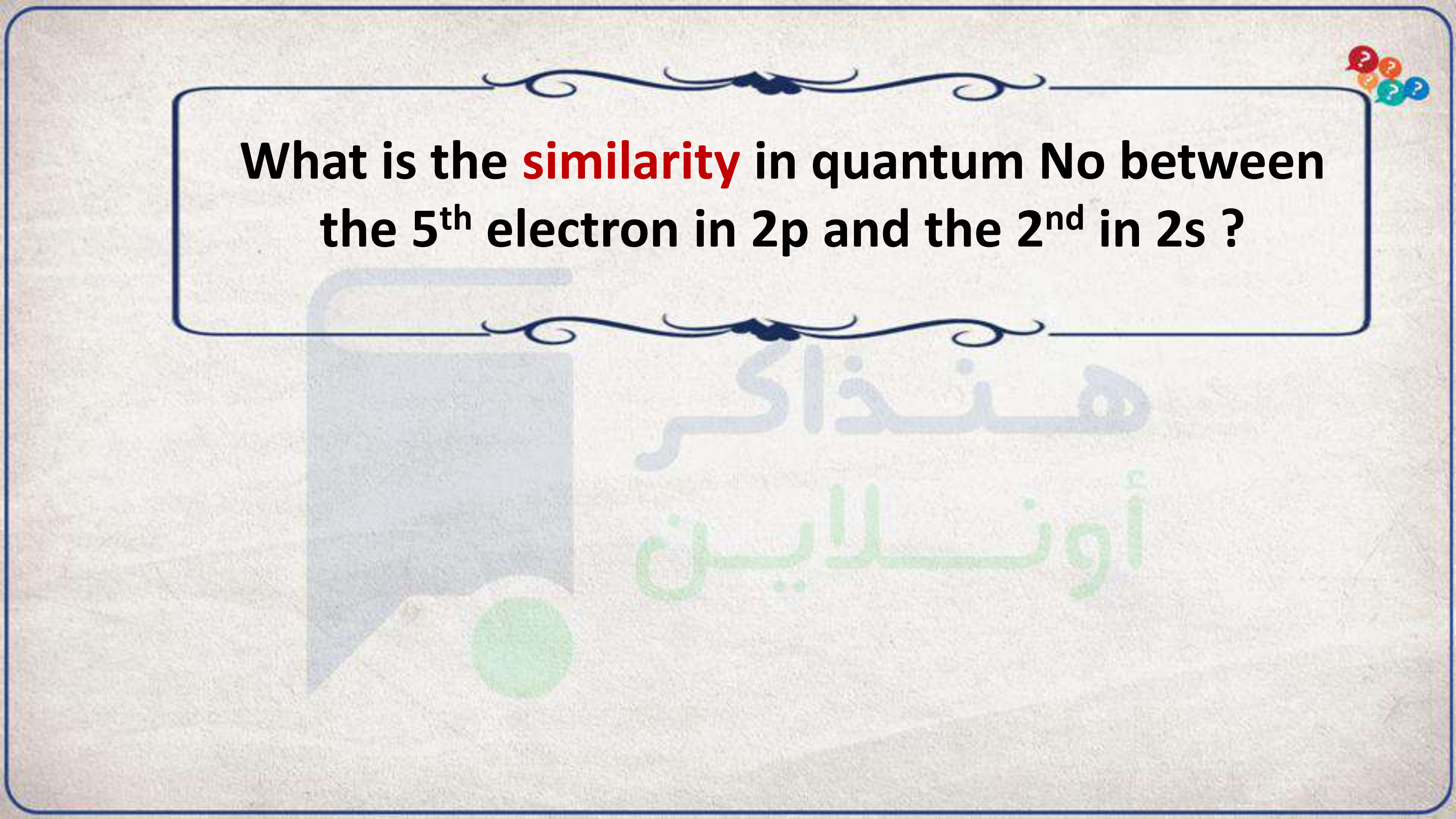


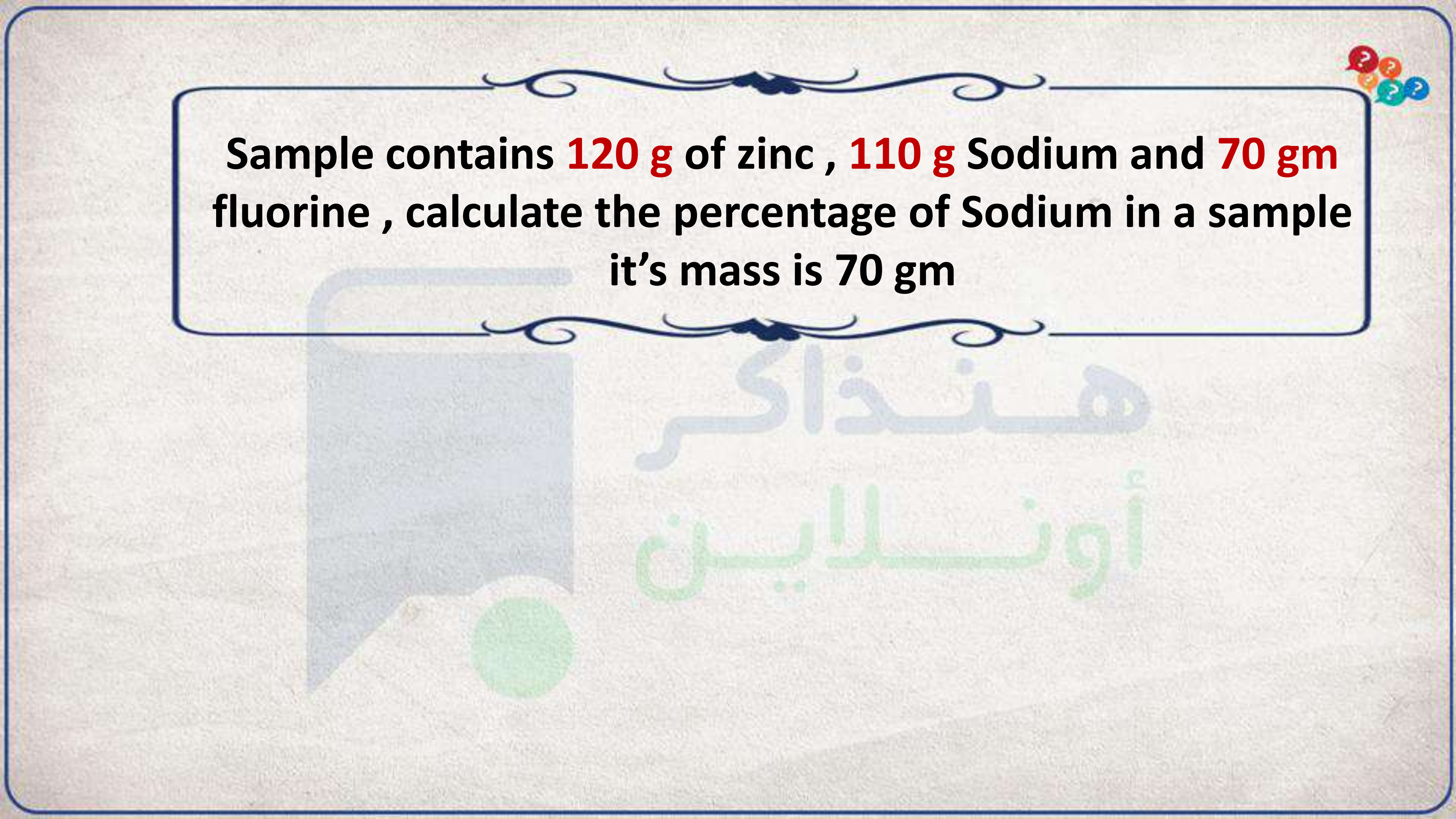
The electronic configuration of zinc atom ${}_{30}Zn$ is represented as follows:

Zn_{30} : $1s^2$, $2s^2$, $2p^6$, $3s^2$, $3p^6$, $4s^2$, $3d^{10}$

Conclude the quantum numbers of:

1. The last electron with the highest energy in the atom of this element.
2. The farthest electron from the nucleus of the atom of this element.


What is the similarity in quantum No between the 5th electron in 2p and the 2nd in 2s ?
هنذاكر
أونلاين


Sample contains 120 g of zinc , 110 g Sodium and 70 gm fluorine , calculate the percentage of Sodium in a sample it’s mass is 70 gm



An atom of a representative element contains four principle energy levels , and its outermost energy level contain three single electrons.

Determine :

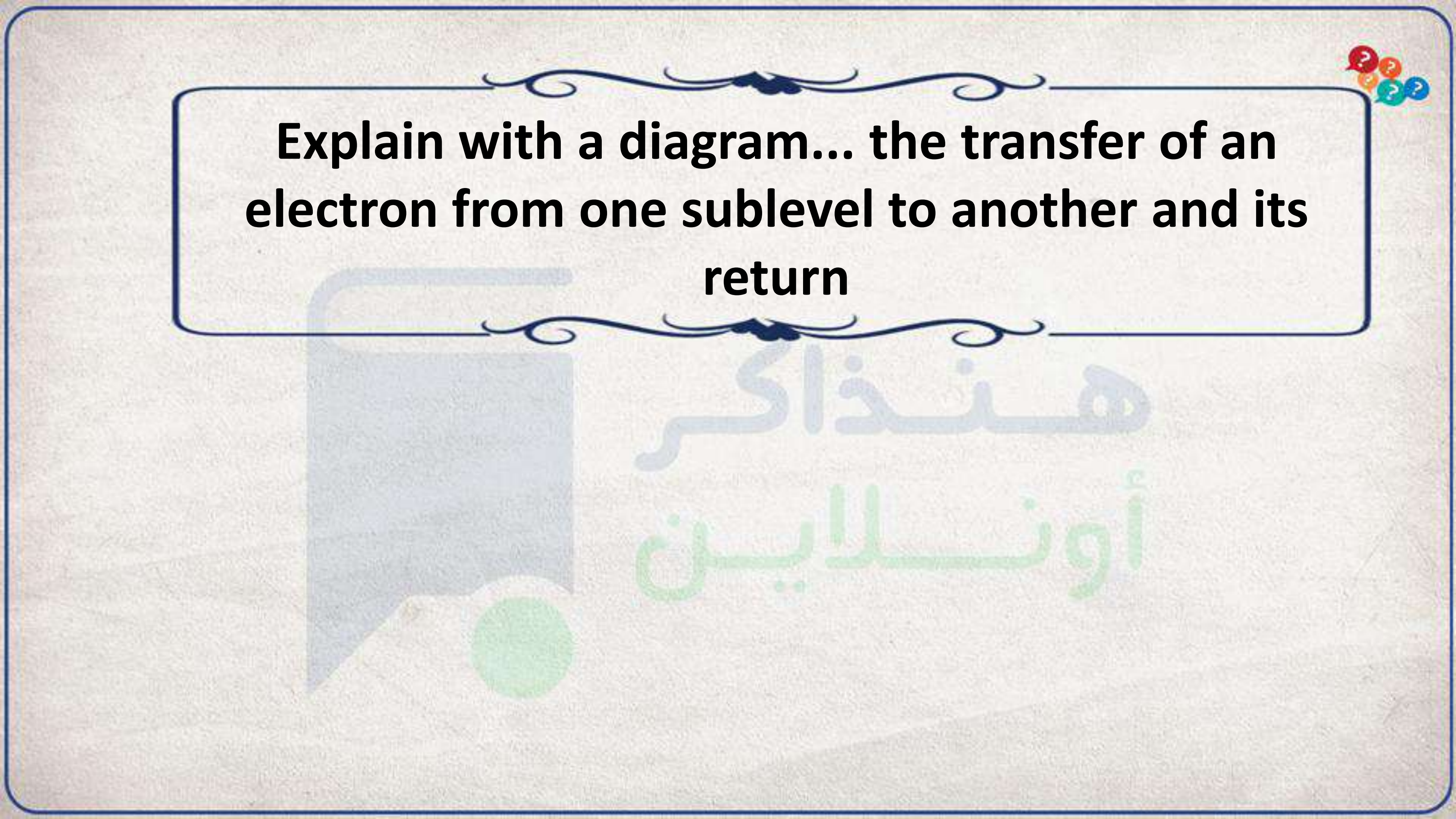
1. Its electronic configuration

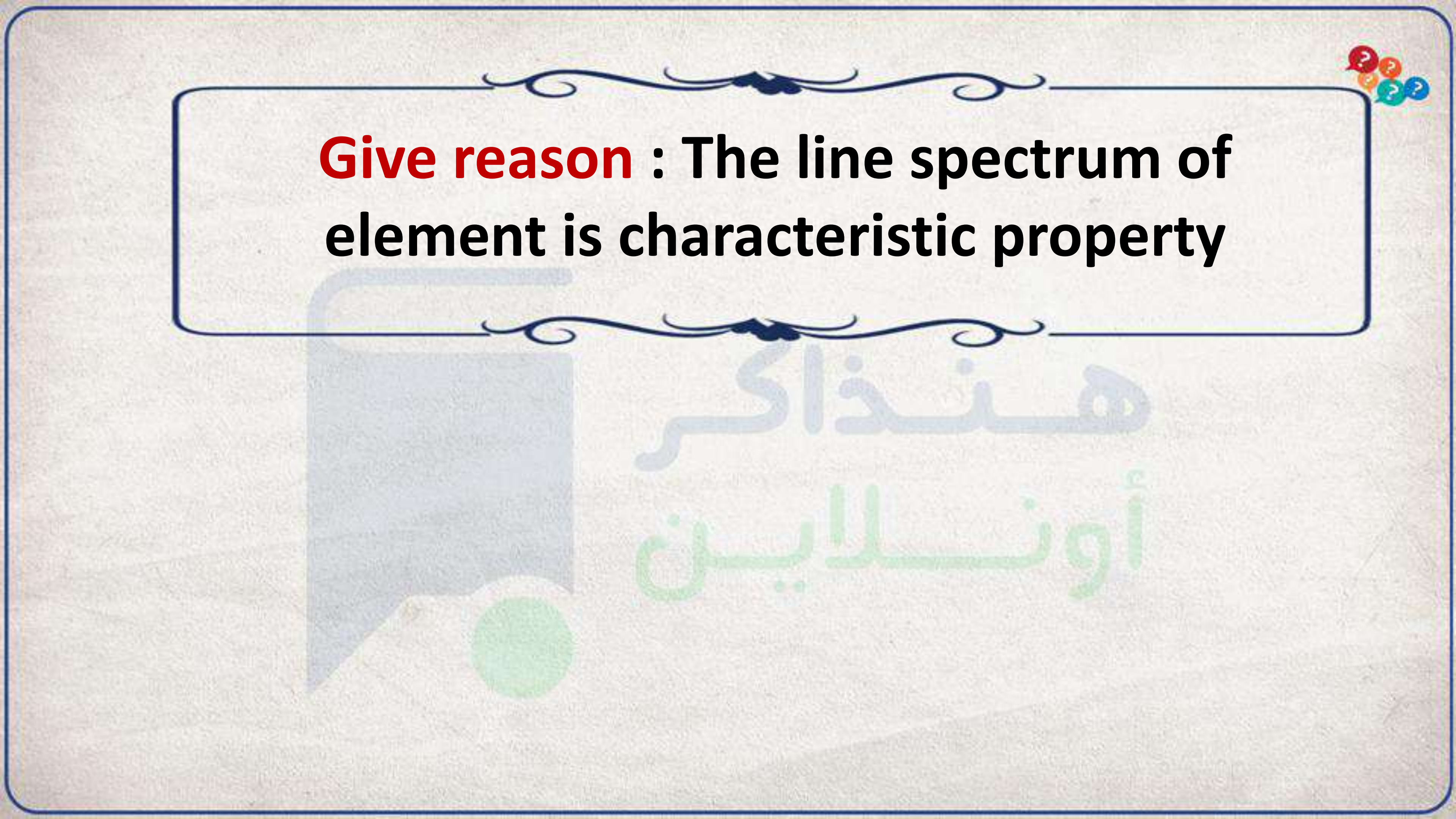
2. No of orbitals that are filled in outermost E.L

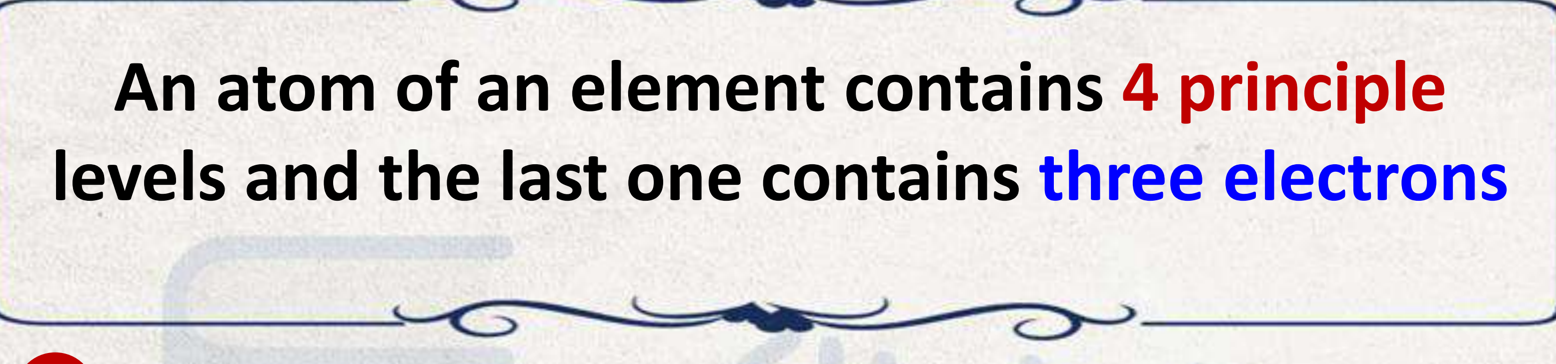
Write the atomic number of the atoms that have the following quantum numbers for the last electron:

1. $n = 3$, $\ell = 2$, $m_\ell = -1$, $m_s = -\frac{1}{2}$

2. $n = 4$, $\ell = 2$, $m_\ell = -2$, $m_s = +\frac{1}{2}$

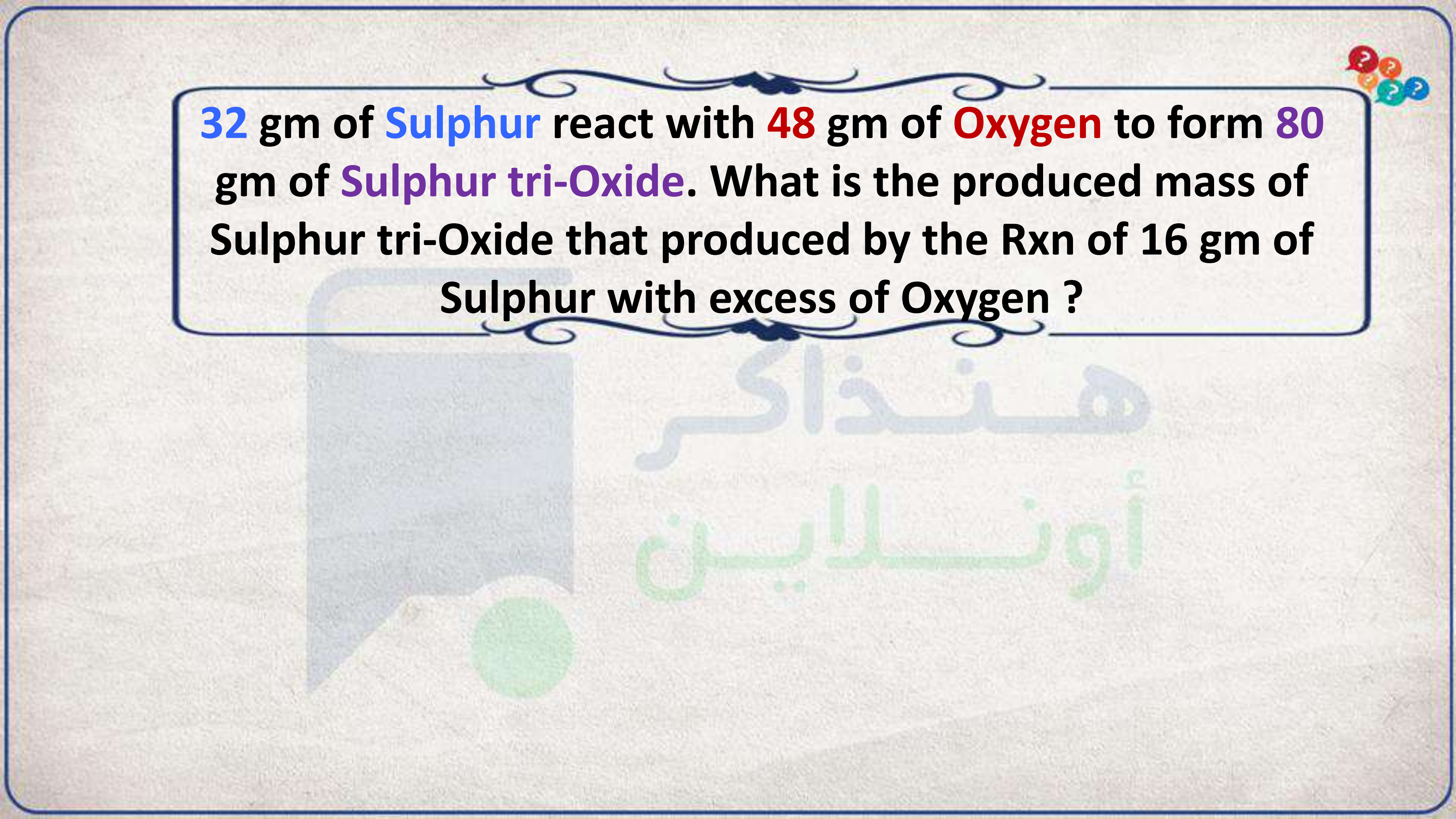

Explain with a diagram... the transfer of an electron from one sublevel to another and its return

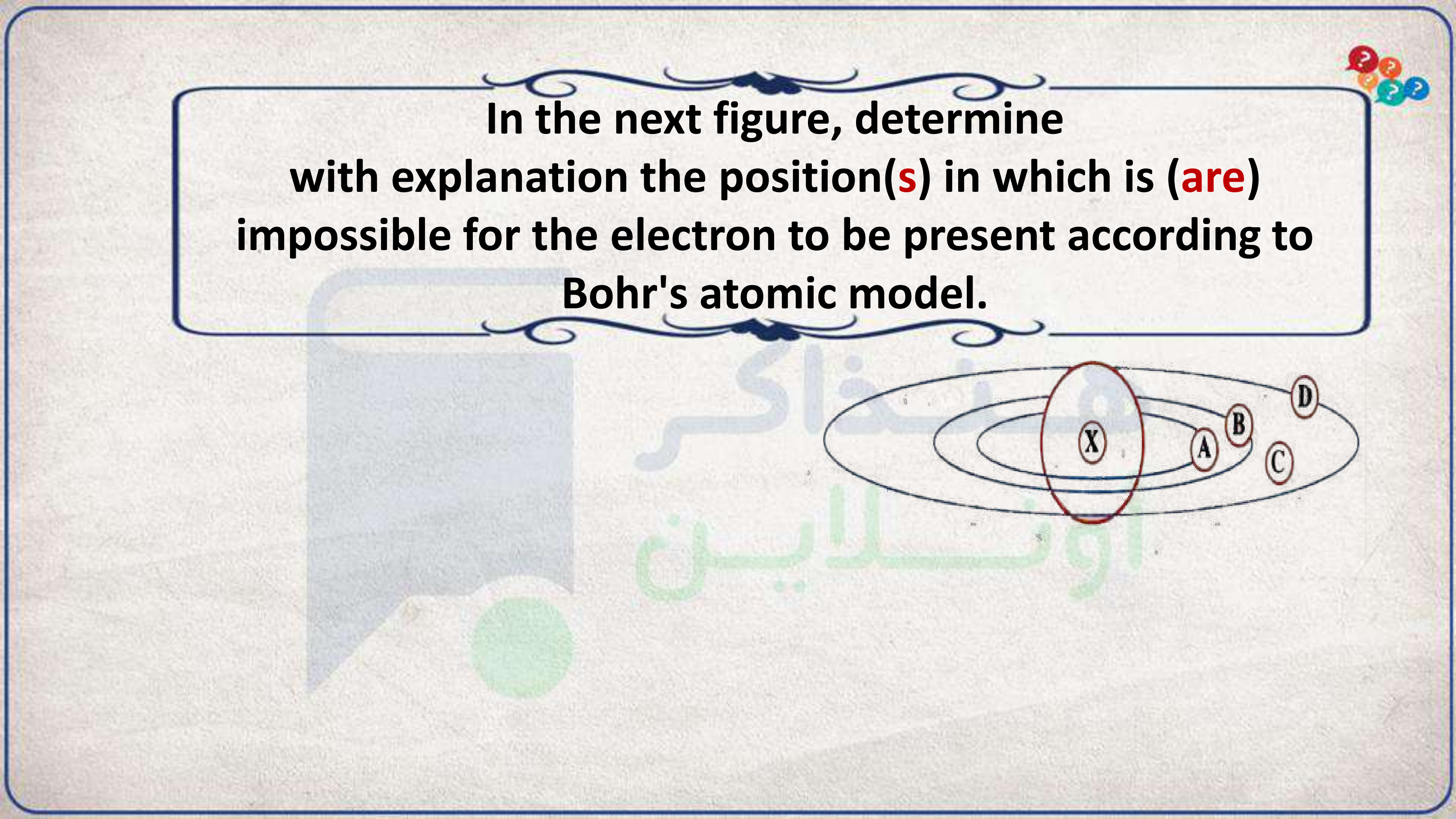

Give reason : The line spectrum of element is characteristic property



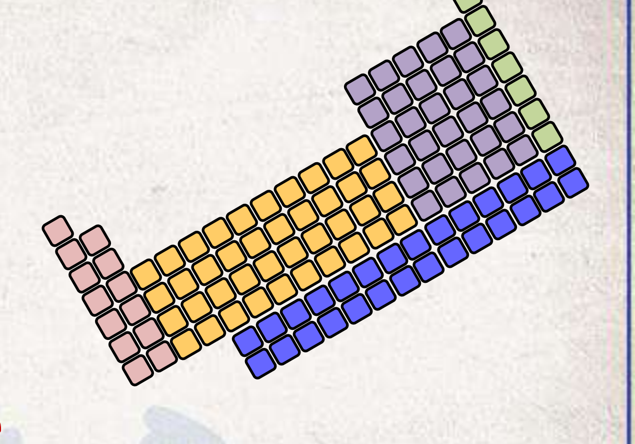
A Write its electronic configuration

B find the group of the element


32 gm of Sulphur react with 48 gm of Oxygen to form 80 gm of Sulphur tri-Oxide. What is the produced mass of Sulphur tri-Oxide that produced by the Rxn of 16 gm of Sulphur with excess of Oxygen ?
هنذاكر
أونلاين


In the next figure, determine
with explanation the position(s) in which is (are)
impossible for the electron to be present according to
Bohr's atomic model.
X
A
B
C
D





Lesson 1 Modern Periodic Table

Lesson 2 Properties of Periodic table
(Radius , I.P , E.a , E.N)

Lesson 3 Properties of Periodic table
(metallic , Acidic property , Oxygenated Cpds,)

Lesson 4 Oxidation Numbers

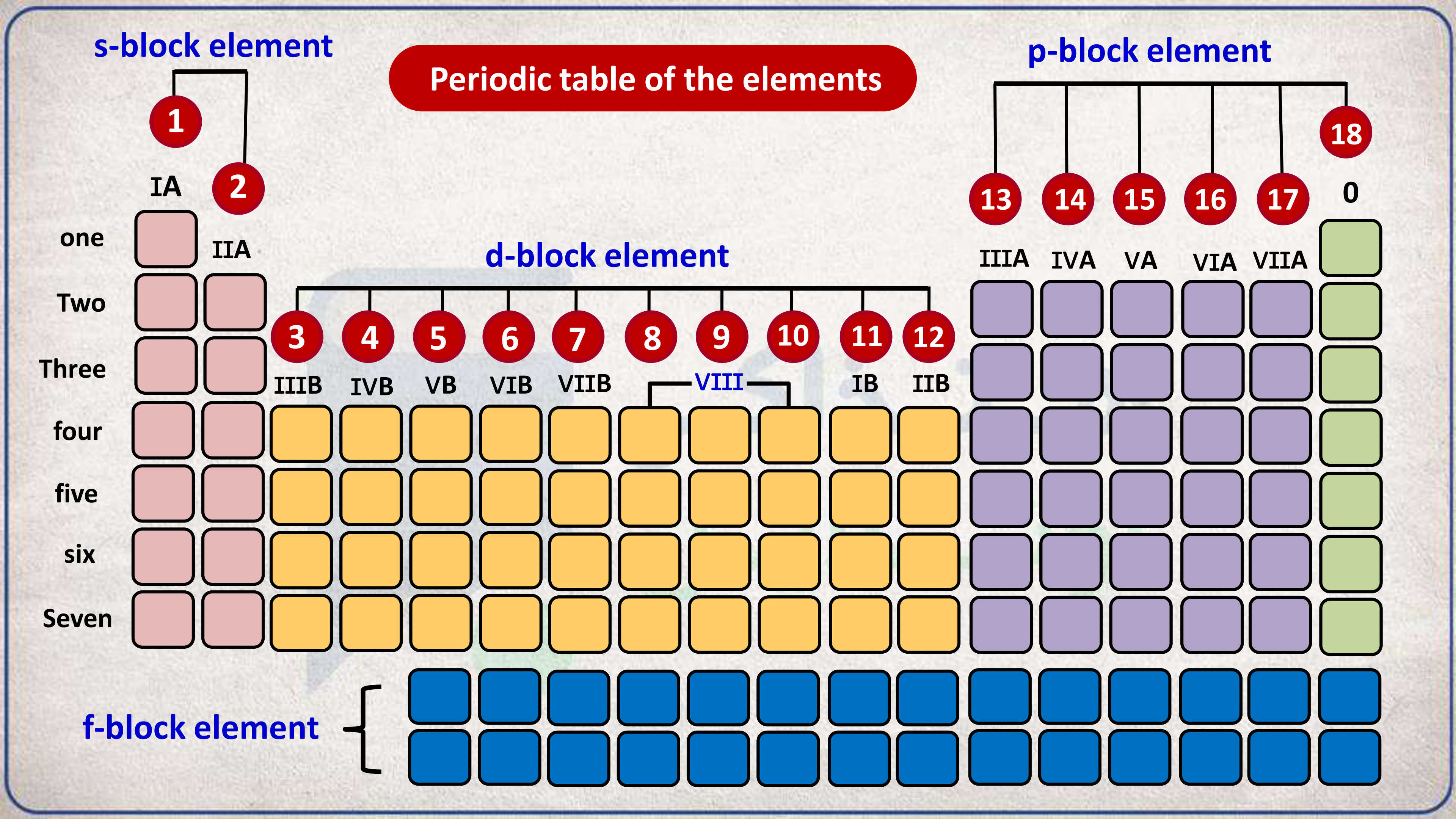
Periodic table of the elements

6
C
Carbon
12

Atomic number
Symbol
Name
Atomic Mass

7 periods

18 groups



Periodic table of the elements
s-block element
p-block element
d-block element
f-block element
1
2
IA
IIA
one
Two
Three
four
five
six
Seven
3
4
5
6
7
8
9
10
11
12
IIIB
IVB
VB
VIB
VIIB
VIII
IB
IIB
13
14
15
16
17
18
IIIA
IVA
VA
VIA
VIIA
0

Periodic table of the elements

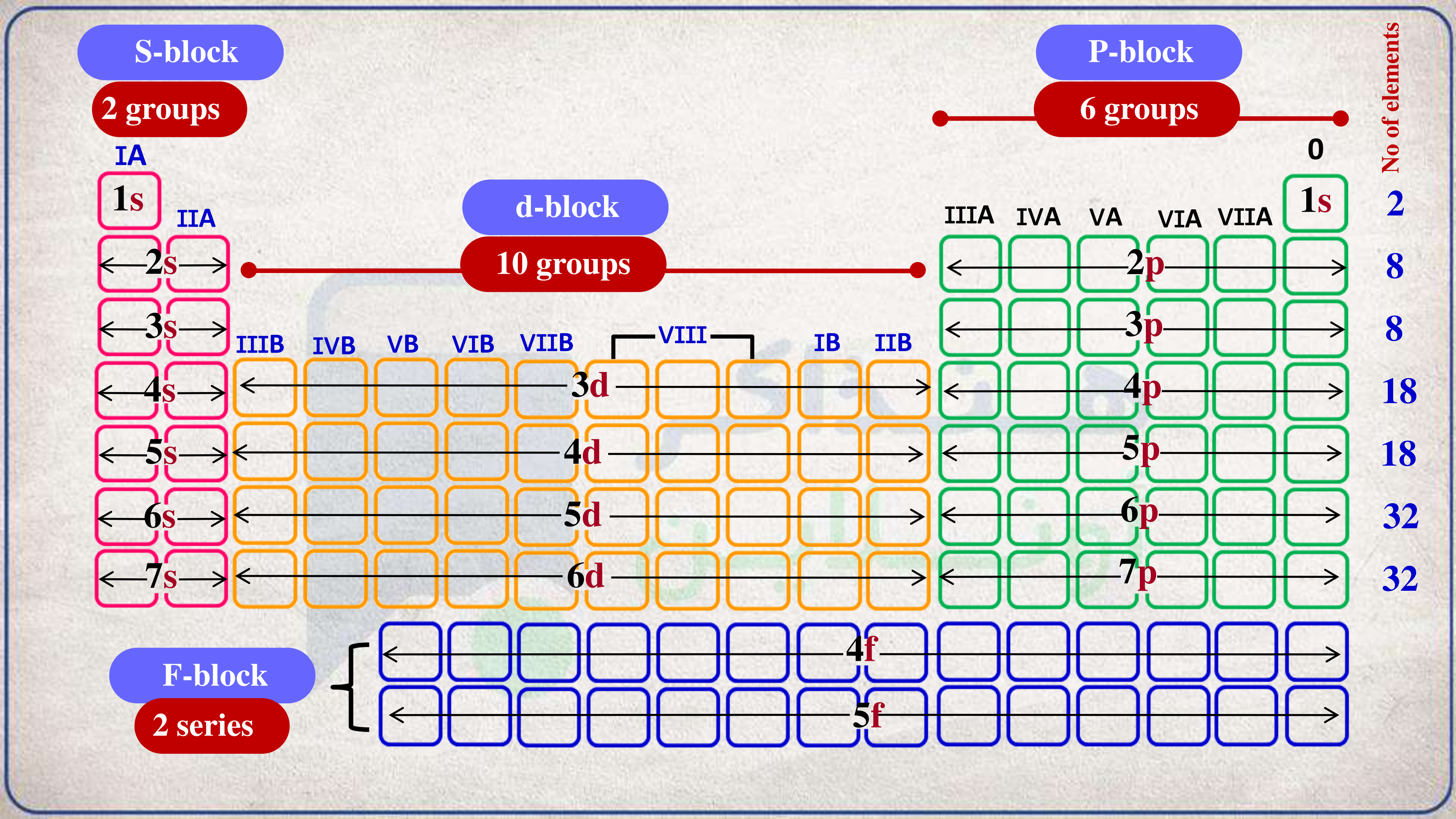
Each period begins by filling a new principal energy level with one electrons, then filling the energy sublevels lying in the same principal energy level successively , until we reach the last element in the period which is a noble gas in which all the levels are completely filled with electrons.

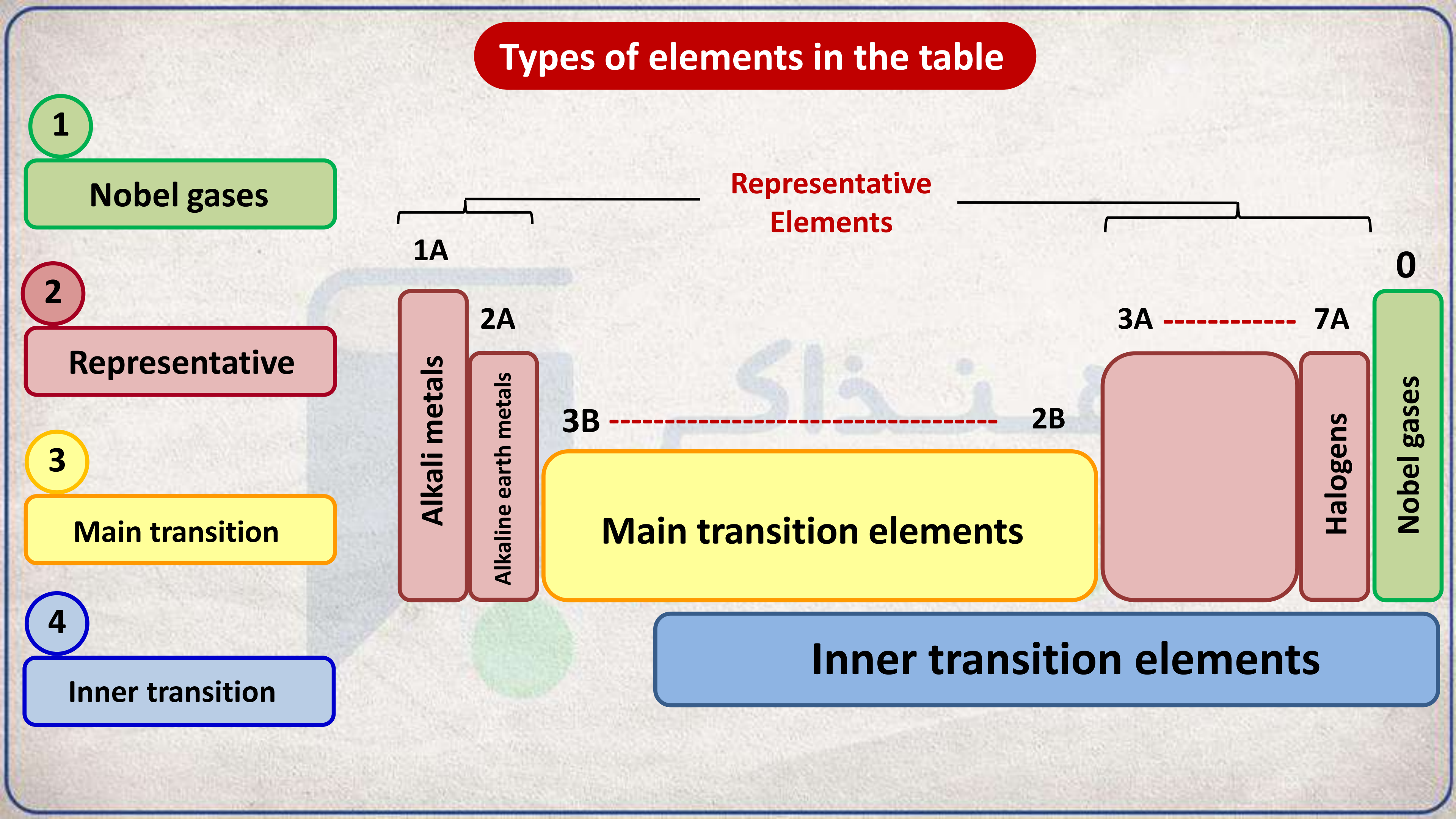
Elements of the same group	Elements of the same period
Similar in 1- chemical properties 2- electronic configuration of the last level (the valence shell) Different in : the principal quantum number (n) of this last energy level	Similar in the principal quantum number (n) of this last energy level Different in : 1- chemical properties 2- electronic configuration of the last level (the valence shell)



The chemical properties are **much alike** in the two elements……

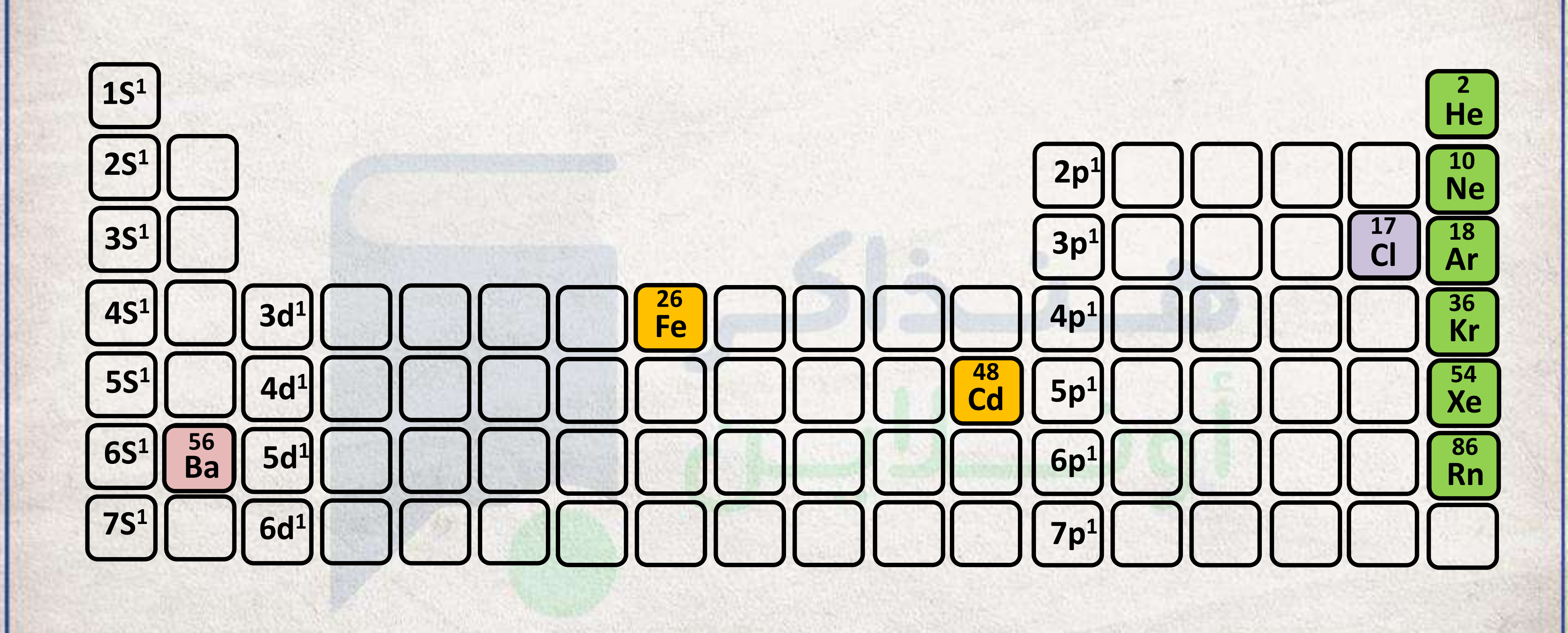
- $_{13}Al\ ,_{14}Si$
- $_{11}Na\ ,_{19}K$
- $_{4}Be\ ,\ _{5}B$
- $_{15}P,\ _{16}S$


S-block
2 groups
IA
IIA
1s
2s
3s
4s
5s
6s
7s
d-block
10 groups
IIIB
IVB
VB
VIB
VIIB
VIII
IB
IIB
3d
4d
5d
6d
P-block
6 groups
0
IIIA
IVA
VA
VIA
VIIA
1s
2p
3p
4p
5p
6p
7p
No of elements
2
8
8
18
18
32
32
F-block
2 series
4f
5f



Types of elements in the table
1
Nobel gases
2
Representative
3
Main transition
4
Inner transition
Representative
Elements
1A
2A
0
3A
7A
3B
2B
Alkali metals
Alkaline earth metals
Main transition elements
Halogens
Nobel gases
Inner transition elements

Electronic configuration of elements in the table



1 s-block elements

- They are placed in the left side of the table.

- The s-block contains the elements whose outermost electrons occupy the "s" sublevel «except He».

- The s-block consists of two groups of elements, they are:
  - 1A whose electronic configuration ends with ns^1
  - 2A whose electronic configuration ends with ns^2

NOTE

"n" is the number of the outermost energy level & number of the period.

2 p-block elements

- They occupy the right side of the table.

- The p-block includes the elements whose outermost electrons occupy the "p" sublevel and their electronic configurations end with (ns^2, $np^{1:6}$) (except helium $1s^2$).

- The p-block consists of six groups , characterized by the letter "A" except "group zero"

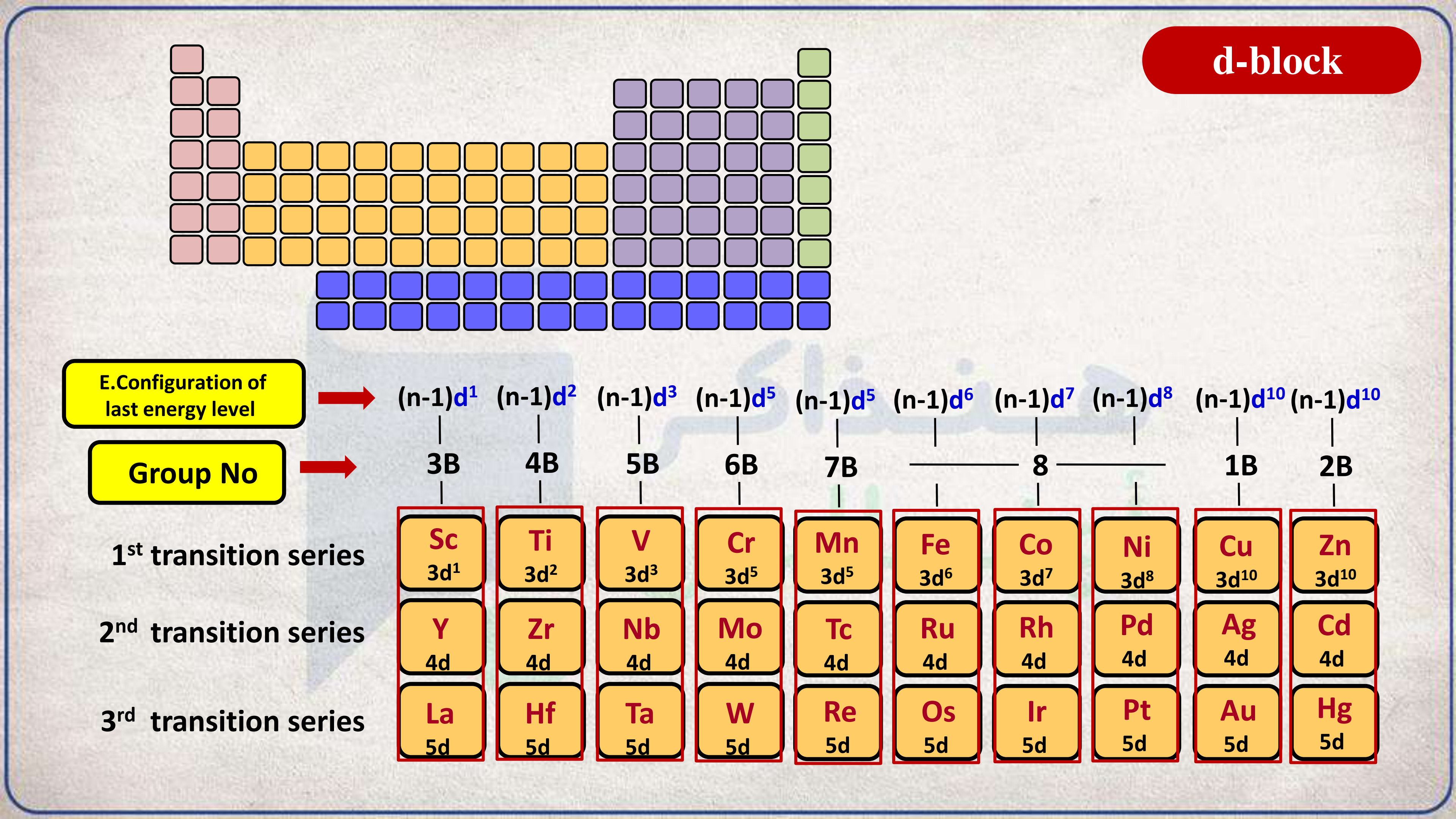
3 d-block elements

- **They occupy the middle of the table.**

- **The d-block contains the elements with the outermost electrons occupy the "d" sublevel and their electronic configurations end with $ns^{1:2}$, $(n-1)\,d^{1:10}$**

- **The d-block consists of "10" vertical columns representing groups which are characterized by the symbol "B" except 8th group (VIII) "3" vertical columns.**

- **The d-block elements are classified according to the number of the outermost energy level and the period number into 3 series**


d-block
E.Configuration of last energy level
Group No
(n-1)d1
(n-1)d2
(n-1)d3
(n-1)d5
(n-1)d5
(n-1)d6
(n-1)d7
(n-1)d8
(n-1)d10
(n-1)d10
3B
4B
5B
6B
7B
8
1B
2B
1st transition series
2nd transition series
3rd transition series
Sc 3d1
Ti 3d2
V 3d3
Cr 3d5
Mn 3d5
Fe 3d6
Co 3d7
Ni 3d8
Cu 3d10
Zn 3d10
Y 4d
Zr 4d
Nb 4d
Mo 4d
Tc 4d
Ru 4d
Rh 4d
Pd 4d
Ag 4d
Cd 4d
La 5d
Hf 5d
Ta 5d
W 5d
Re 5d
Os 5d
Ir 5d
Pt 5d
Au 5d
Hg 5d

1 The first transition series:

- It includes the elements in which the "3d" sublevel is filled successively.

- It lies in the fourth period and includes the elements from scandium ($_{21}Sc$) to zinc ($_{30}Zn$).

2 The second transition series

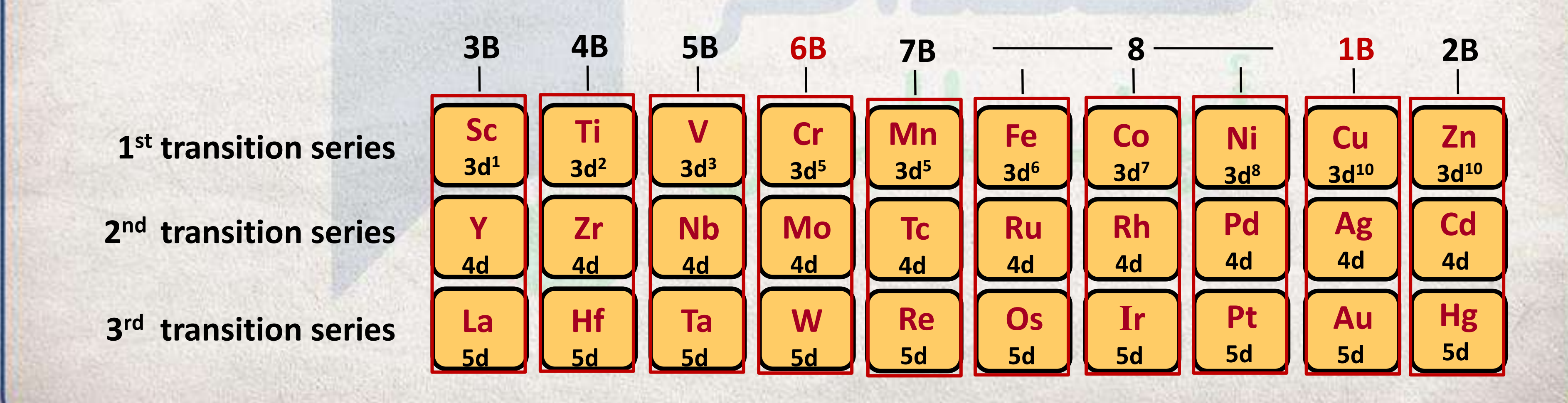
- It includes the elements in which the "4d" sublevel is filled successively.

- It lies in the fifth period and includes the elements from yttrium ($_{39}Y$) to cadmium ($_{48}Cd$).

3 The third transition series

- It includes the elements in which the "5d" sublevel is filled successively.

- It lies in the sixth period and includes the elements from lanthanum ($_{57}La$) to mercury ($_{80}Hg$).



2 f-block elements

- They are separated down the table, to avoid being too long.
- In this block the "f" sublevel is filled successively.
- The f-block is divided into two series (each contains 14 elements)

Note

The electronic configurations of the elements of f-block are not regularly configured

A The lanthanides series:

- It is placed in the sixth period, in which the "4f " sublevel is filled successively , it includes 14 elements.

- The elements of this series were named - inaccurately - by rare earths

because they are quite similar in behavior and very difficult to be separated from each other as the outermost energy level for all of them is $6s^2$

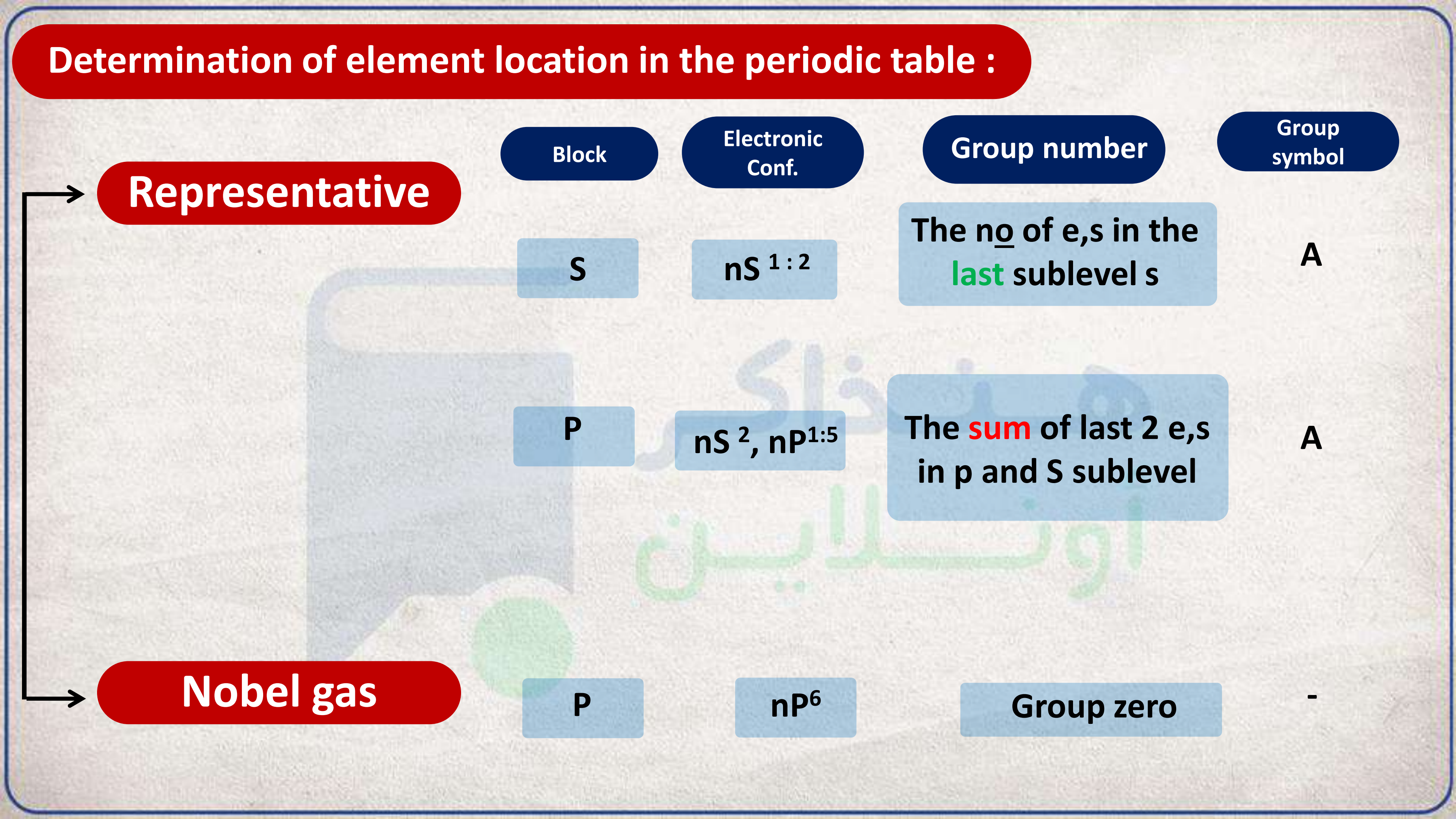
that name is not accurate, as recently their oxides could be separated by ionic exchange.

B The actinides series:

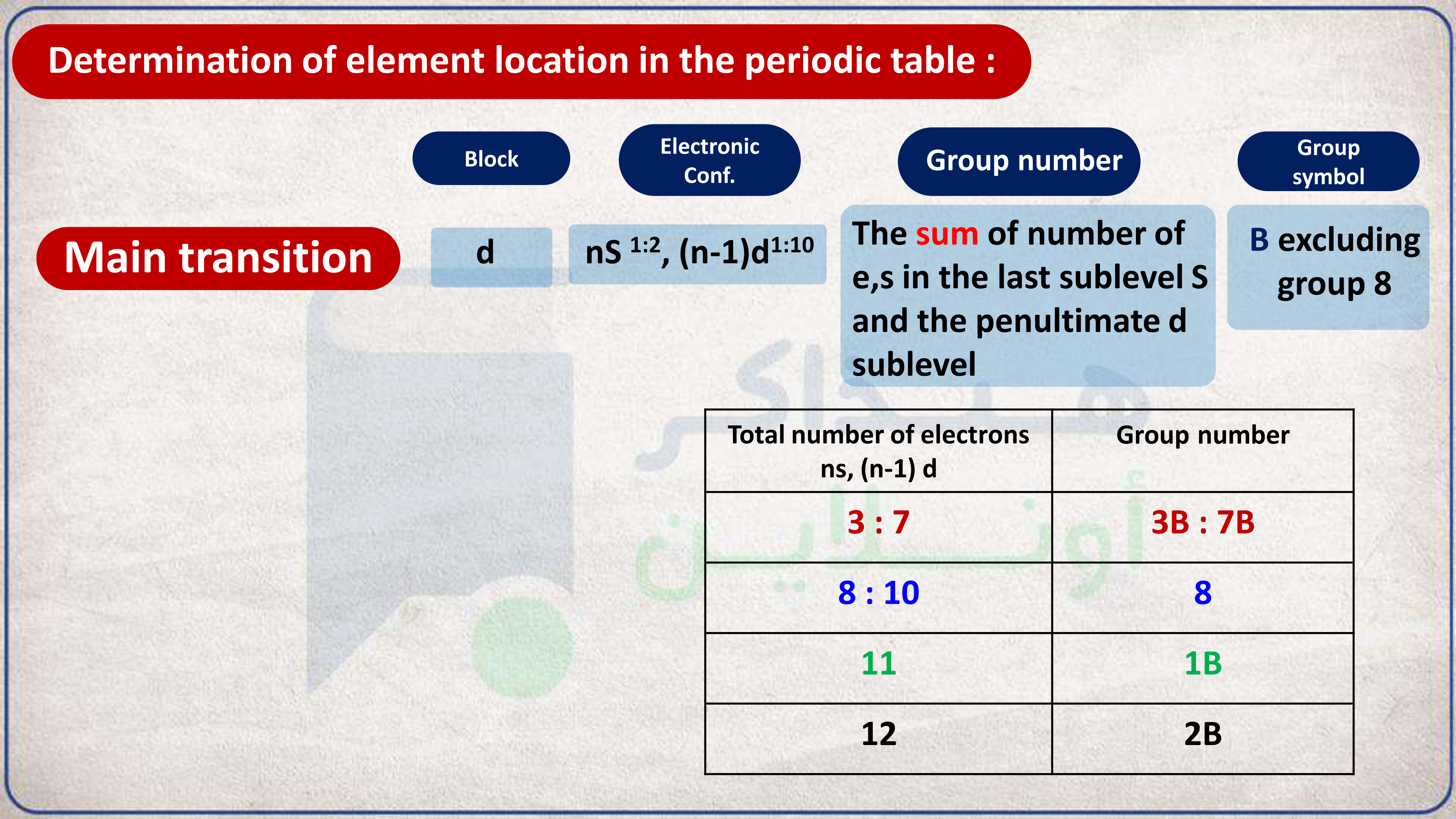
✓ It is placed in the seventh period, in which the "5f" sublevel is filled successively , it also includes 14 elements.

the outermost energy level for all of them is $7s^2$

All the elements of this series are radioactive (their nuclei are unstable)



Determination of element location in the periodic table :
Block
Electronic Conf.
Group number
Group symbol
Representative
S
nS 1 : 2
The no of e,s in the last sublevel s
A
P
nS 2, nP1:5
The sum of last 2 e,s in p and S sublevel
A
Nobel gas
P
nP6
Group zero
-

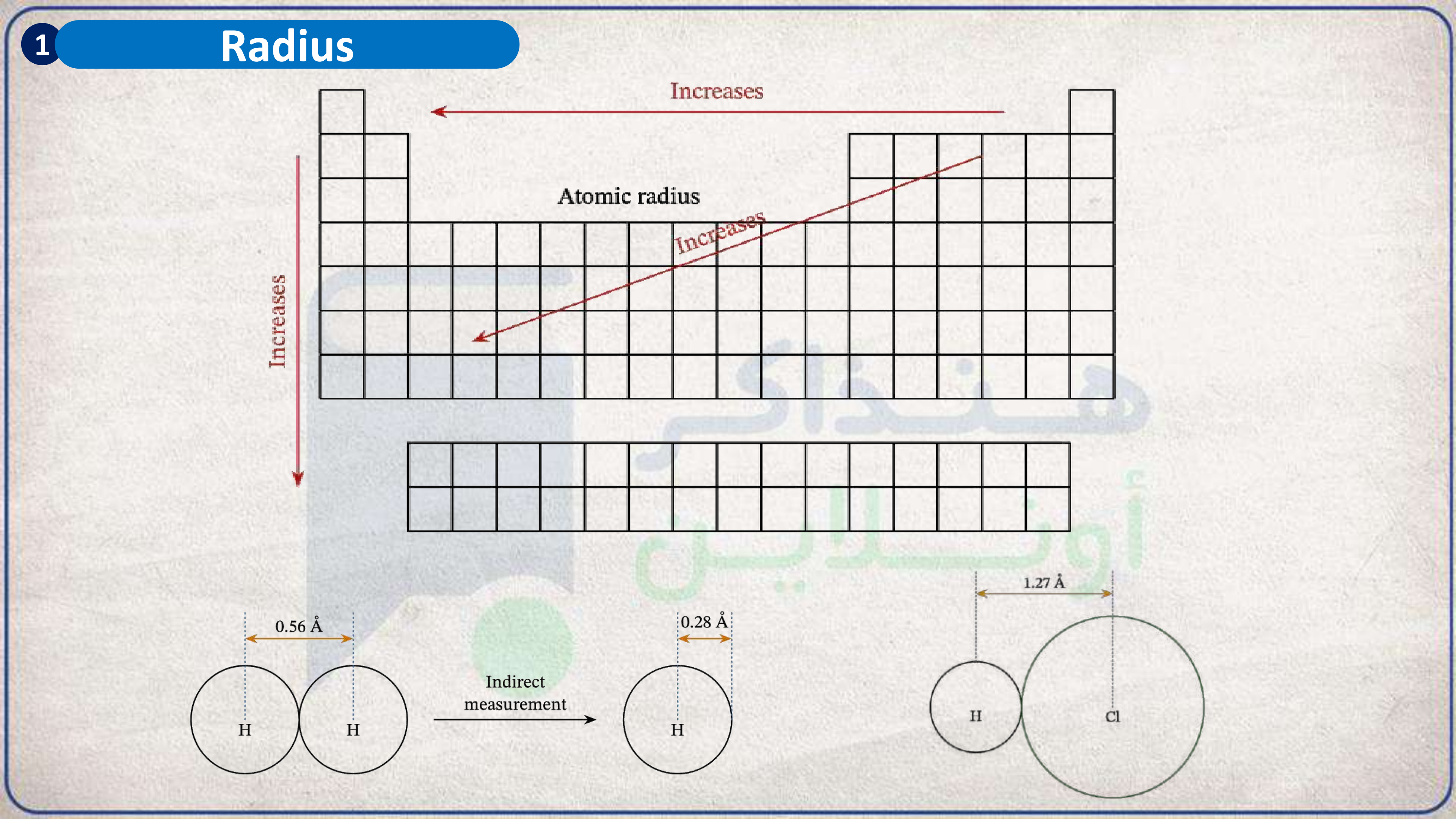

Determination of element location in the periodic table :
Block
Electronic Conf.
Group number
Group symbol
Main transition
d
nS 1:2, (n-1)d1:10
The sum of number of e,s in the last sublevel S and the penultimate d sublevel
B excluding group 8
Total number of electrons ns, (n-1) d
Group number
3 : 7
3B : 7B
8 : 10
8
11
1B
12
2B

The graduation of properties

1. The atomic radius
2. *ionization potential (ionization energy)*
3. *Electron affinity*
4. *Electronegativity*
5. Metallic and nonmetallic property
6. Acidic and basic property

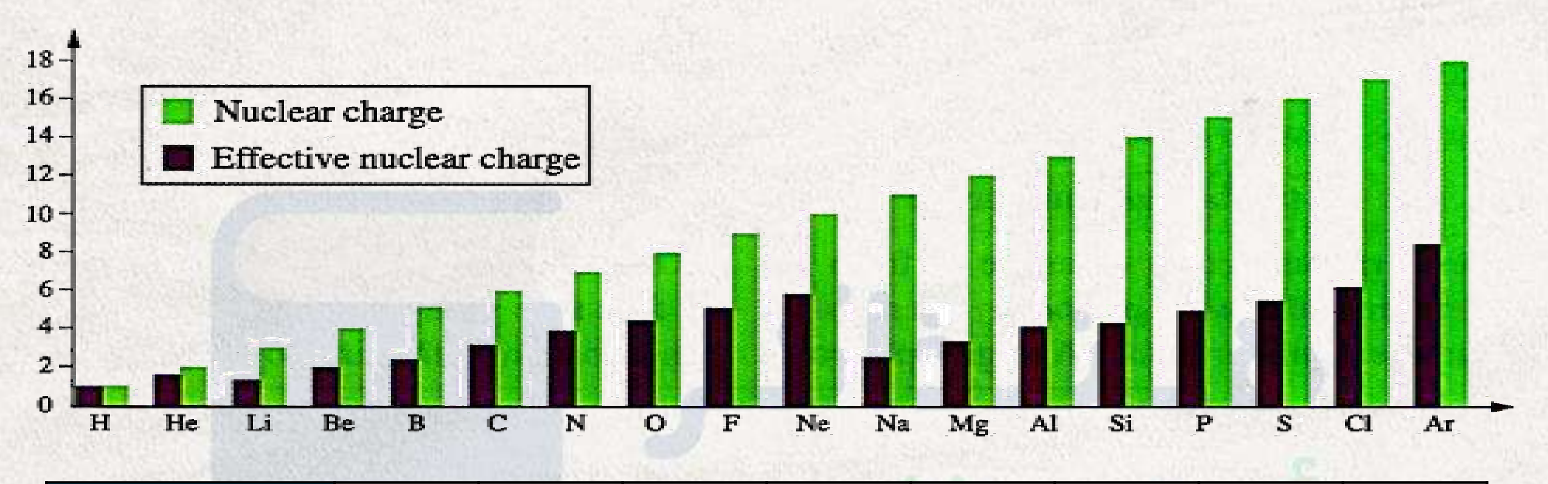
1 Radius

Sizes of Atoms and Their Ions in Picometres									
Group 1		Group 2		Group 13		Group 16		Group 17	
Li^+ 90	Li 134	Be^{2+} 59	Be 90	B^{3+} 41	B 82	O 73	O^{2-} 126	F 71	F^- 119
Na^+ 116	Na 154	Mg^{2+} 86	Mg 130	Al^{3+} 68	Al 118	S 102	S^{2-} 170	Cl 99	Cl^- 167
K^+ 152	K 196	Ca^{2+} 114	Ca 174	Ga^{3+} 76	Ga 126	Se 116	Se^{2-} 184	Br 114	Br^- 182
Rb^+ 166	Rb 211	Sr^{2+} 132	Sr 192	In^{3+} 94	In 144	Te 135	Te^{2-} 207	I 133	I^- 206

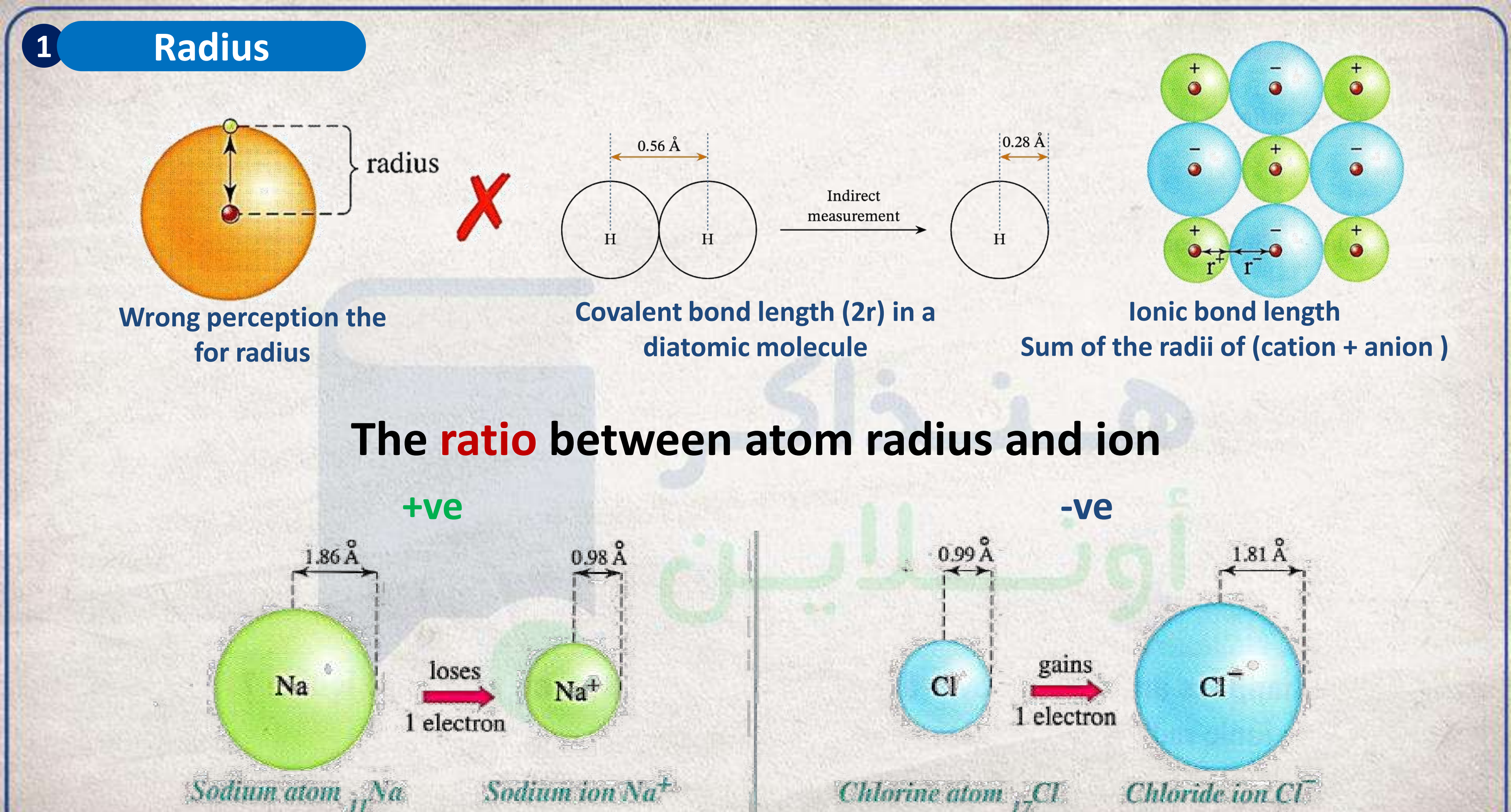

1
Radius
Increases
Atomic radius
Increases
Increases
0.56 Å
H
H
Indirect
measurement
0.28 Å
H
1.27 Å
H
Cl

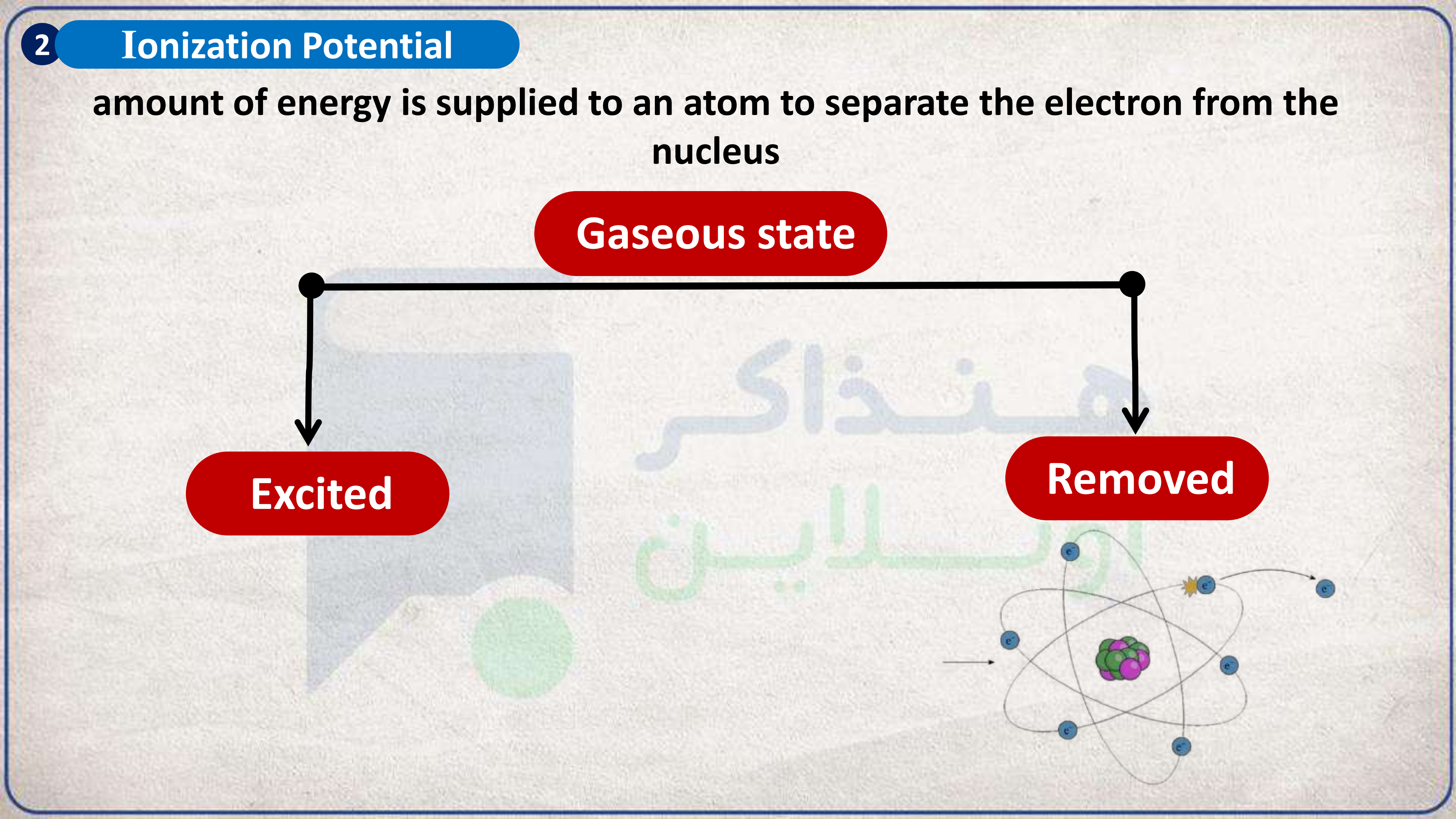
1

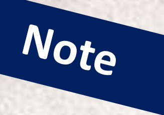
Radius



The element	Li	Be	B	C	N	N	F	Ne
Z	3	4	5	6	7	8	9	10
Z_{eff}	1.28	1.91	2.42	3.14	3.83	4.45	5.10	5.76


1
Radius
radius
Wrong perception the for radius
0.56 Å
H
H
Indirect measurement
0.28 Å
H
Covalent bond length (2r) in a diatomic molecule
+
−
r+
r−
Ionic bond length
Sum of the radii of (cation + anion)
The ratio between atom radius and ion
+ve
-ve
1.86 Å
Na
loses
1 electron
0.98 Å
Na+
Sodium atom 11Na
Sodium ion Na+
0.99 Å
Cl
gains
1 electron
1.81 Å
Cl−
Chlorine atom 17Cl
Chloride ion Cl−


2
Ionization Potential
amount of energy is supplied to an atom to separate the electron from the nucleus
Gaseous state
Excited
Removed

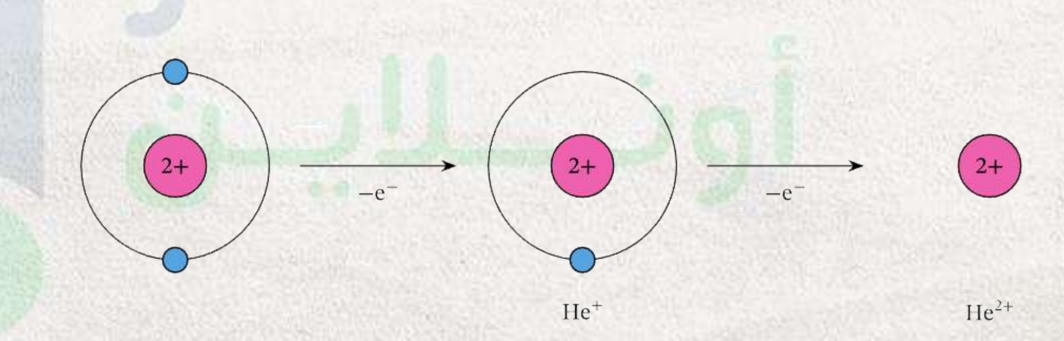


1. The first ionization potential of noble gases is **very high** , due to the stability of their stability

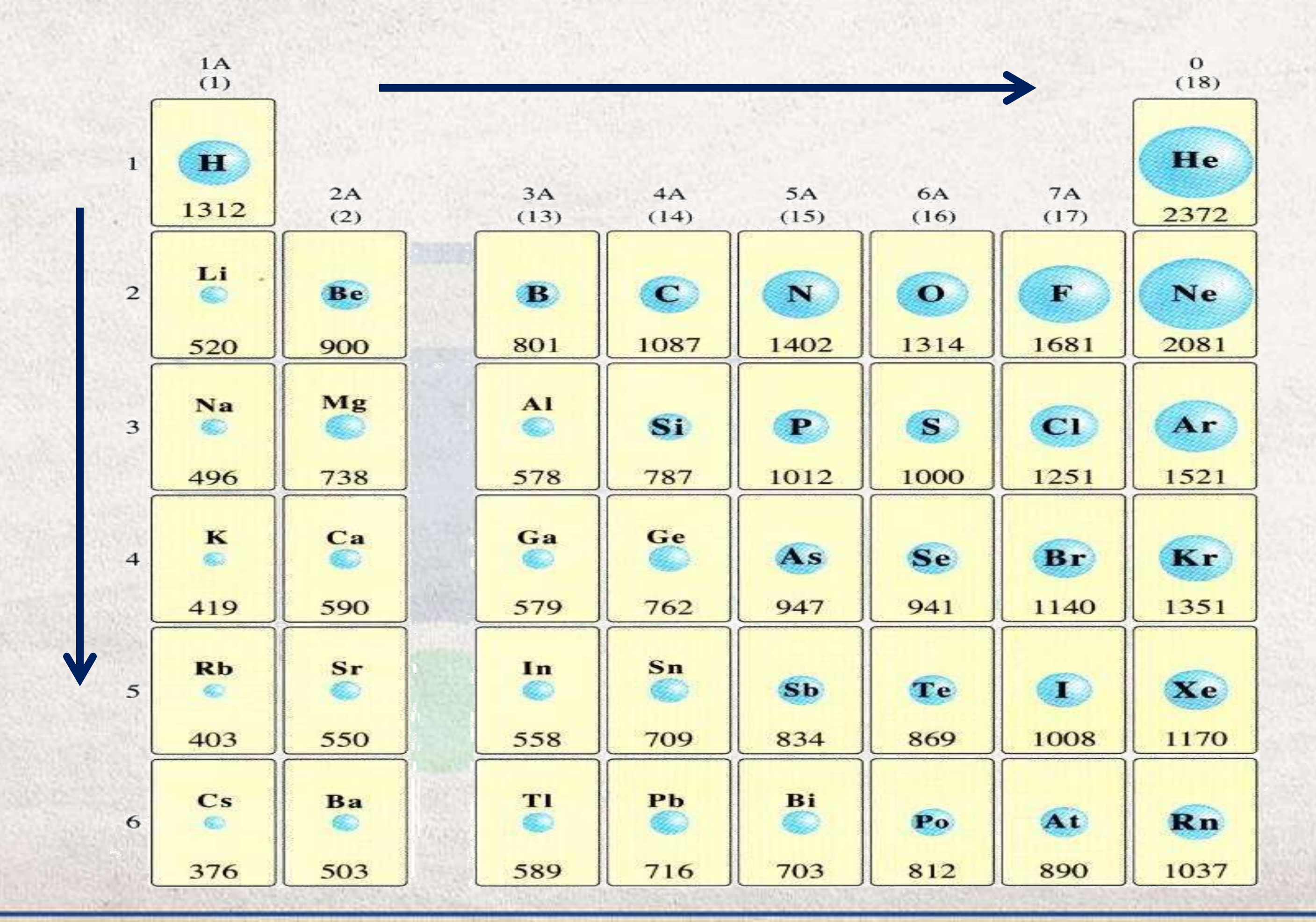
2. The first ionization energy of alkali metals is **lower** than that of all elements

3. 1^{St} I.P < 2^{nd} I.P < 3^{rd} I.P

4. 2^{nd} I.P of 1A is very high



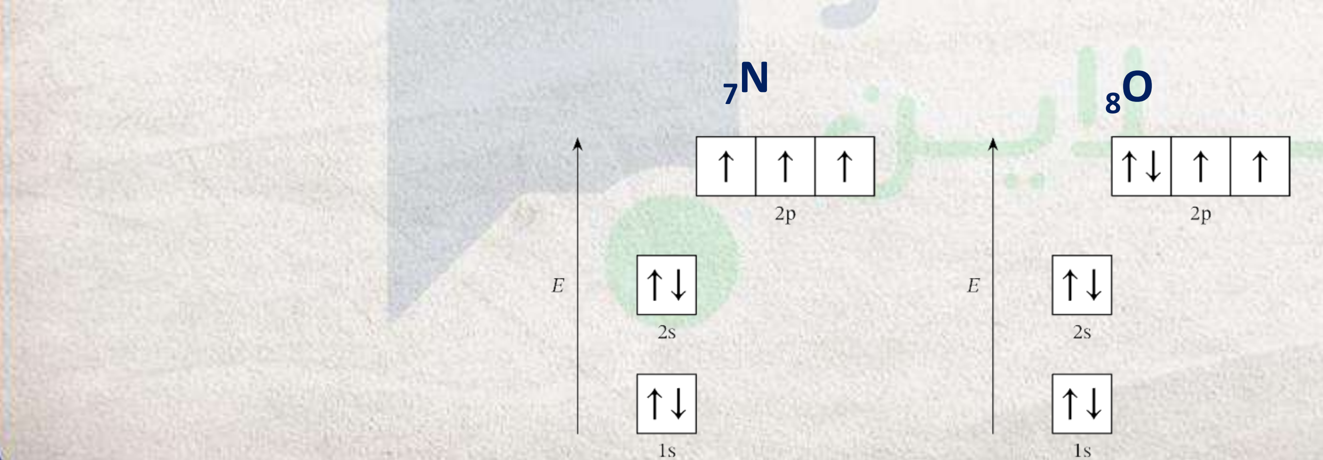
2 Ionization Potential





1. I.P of phosphorus $_{15}P$ is higher than I.P of sulphur $_{16}S$ although phosphorus precedes sulphur in the same period

2. I.P of aluminum $_{13}Al$ is lower than that of magnesium $_{12}Mg$, although aluminum comes next magnesium in the same period



3 Electron Affinity

Gain an extra electron in gaseous state

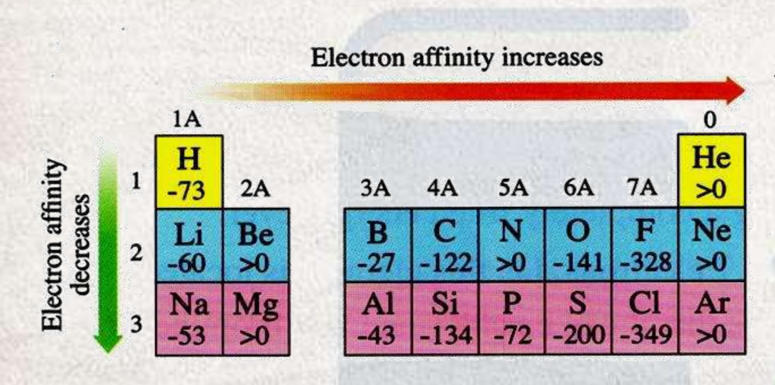
Note

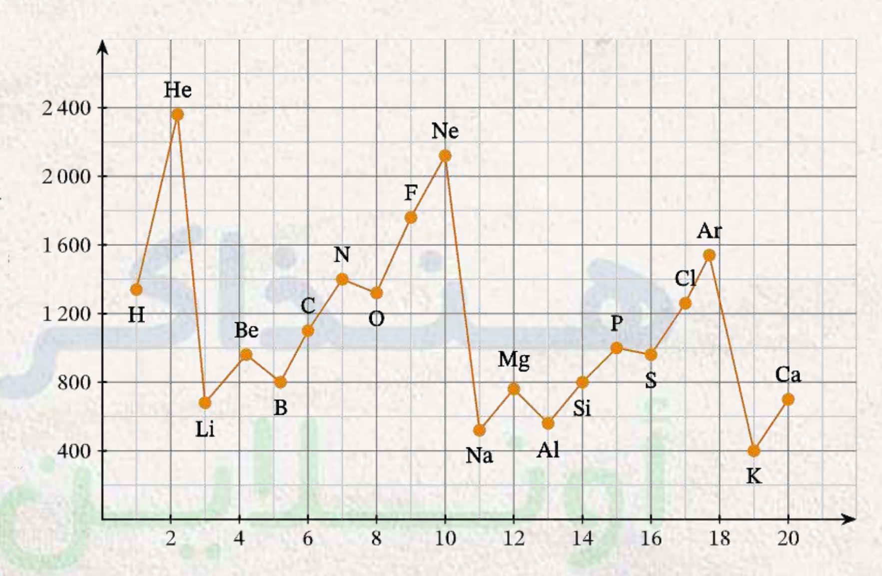
1. The magnitude of the electron affinity is high when the added electron makes the sublevel
   1. half filled
   2. completely filled

2. The electron affinity values for beryllium (Be) , nitrogen , (N) and Neon (Ne) are close to zero

3. E.a of Chlorine is higher than that of fluorine

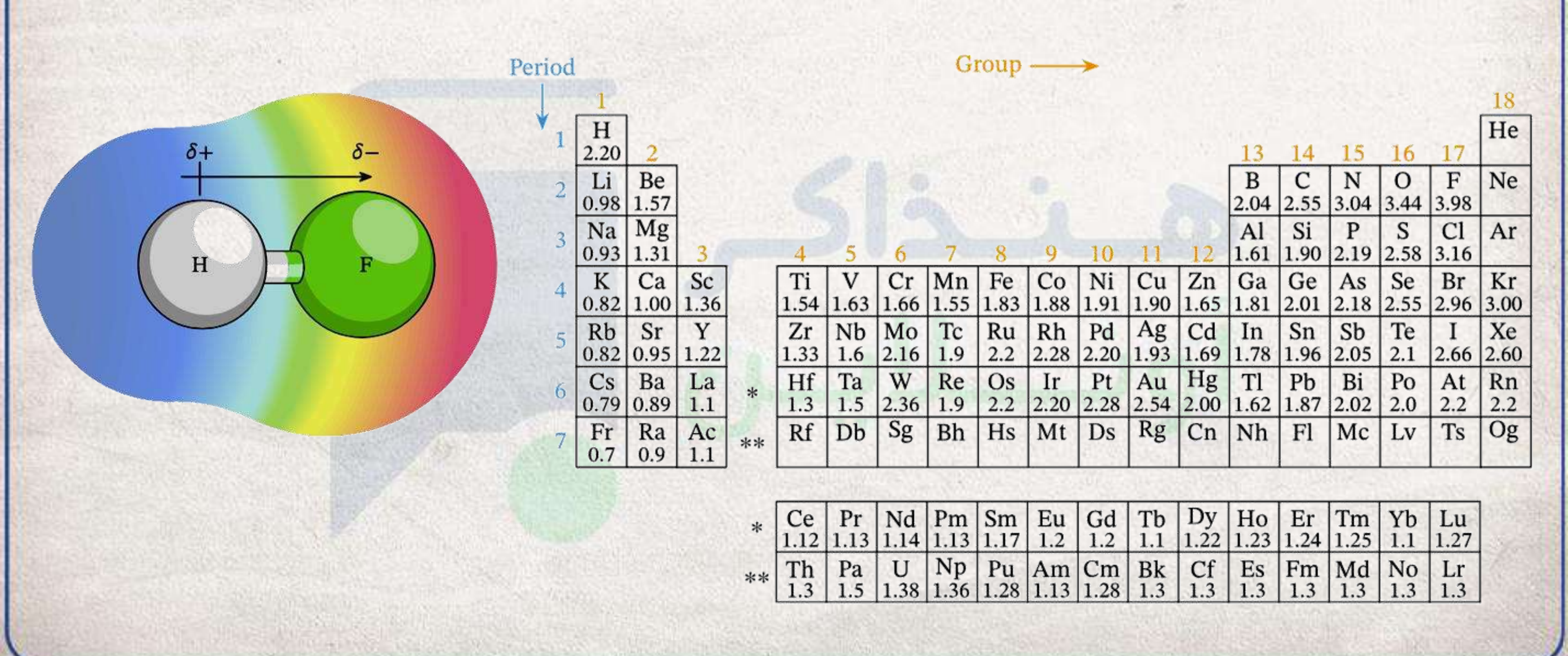
The graduation of electron affinity in the periodic table





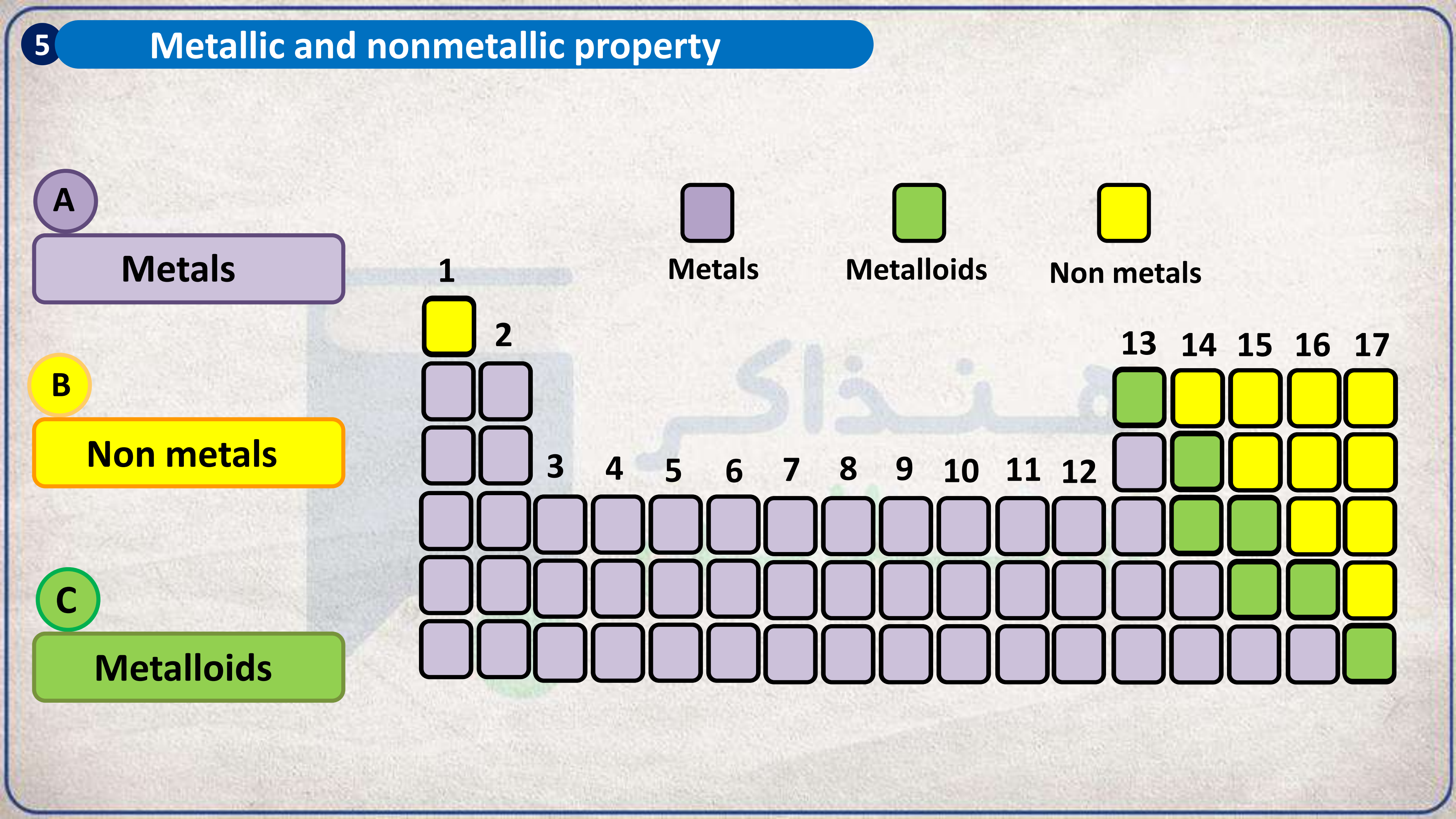
4 Electronegativity

the ability of an atom to attract the electrons of the chemical bond to itself



Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	H 2.20																	He
2	Li 0.98	Be 1.57											B 2.04	C 2.55	N 3.04	O 3.44	F 3.98	Ne
3	Na 0.93	Mg 1.31											Al 1.61	Si 1.90	P 2.19	S 2.58	Cl 3.16	Ar
4	K 0.82	Ca 1.00	Sc 1.36	Ti 1.54	V 1.63	Cr 1.66	Mn 1.55	Fe 1.83	Co 1.88	Ni 1.91	Cu 1.90	Zn 1.65	Ga 1.81	Ge 2.01	As 2.18	Se 2.55	Br 2.96	Kr 3.00
5	Rb 0.82	Sr 0.95	Y 1.22	Zr 1.33	Nb 1.6	Mo 2.16	Tc 1.9	Ru 2.2	Rh 2.28	Pd 2.20	Ag 1.93	Cd 1.69	In 1.78	Sn 1.96	Sb 2.05	Te 2.1	I 2.66	Xe 2.60
6	Cs 0.79	Ba 0.89	La 1.1 *	Hf 1.3	Ta 1.5	W 2.36	Re 1.9	Os 2.2	Ir 2.20	Pt 2.28	Au 2.54	Hg 2.00	Tl 1.62	Pb 1.87	Bi 2.02	Po 2.0	At 2.2	Rn 2.2
7	Fr 0.7	Ra 0.9	Ac 1.1 **	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og

*	Ce 1.12	Pr 1.13	Nd 1.14	Pm 1.13	Sm 1.17	Eu 1.2	Gd 1.2	Tb 1.1	Dy 1.22	Ho 1.23	Er 1.24	Tm 1.25	Yb 1.1	Lu 1.27
**	Th 1.3	Pa 1.5	U 1.38	Np 1.36	Pu 1.28	Am 1.13	Cm 1.28	Bk 1.3	Cf 1.3	Es 1.3	Fm 1.3	Md 1.3	No 1.3	Lr 1.3

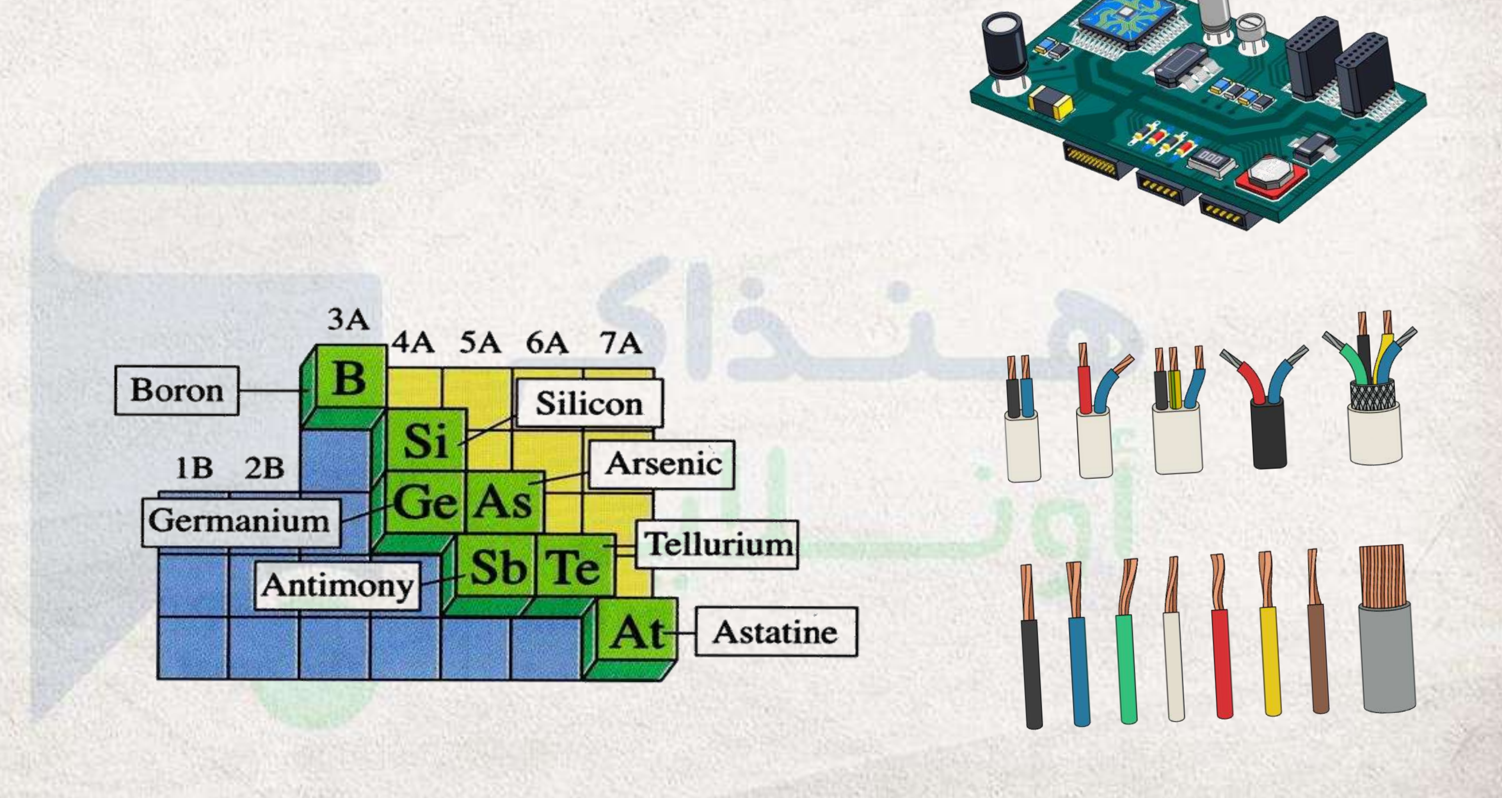

5
Metallic and nonmetallic property
A
Metals
B
Non metals
C
Metalloids
Metals
Metalloids
Non metals
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

5 Metallic and nonmetallic property

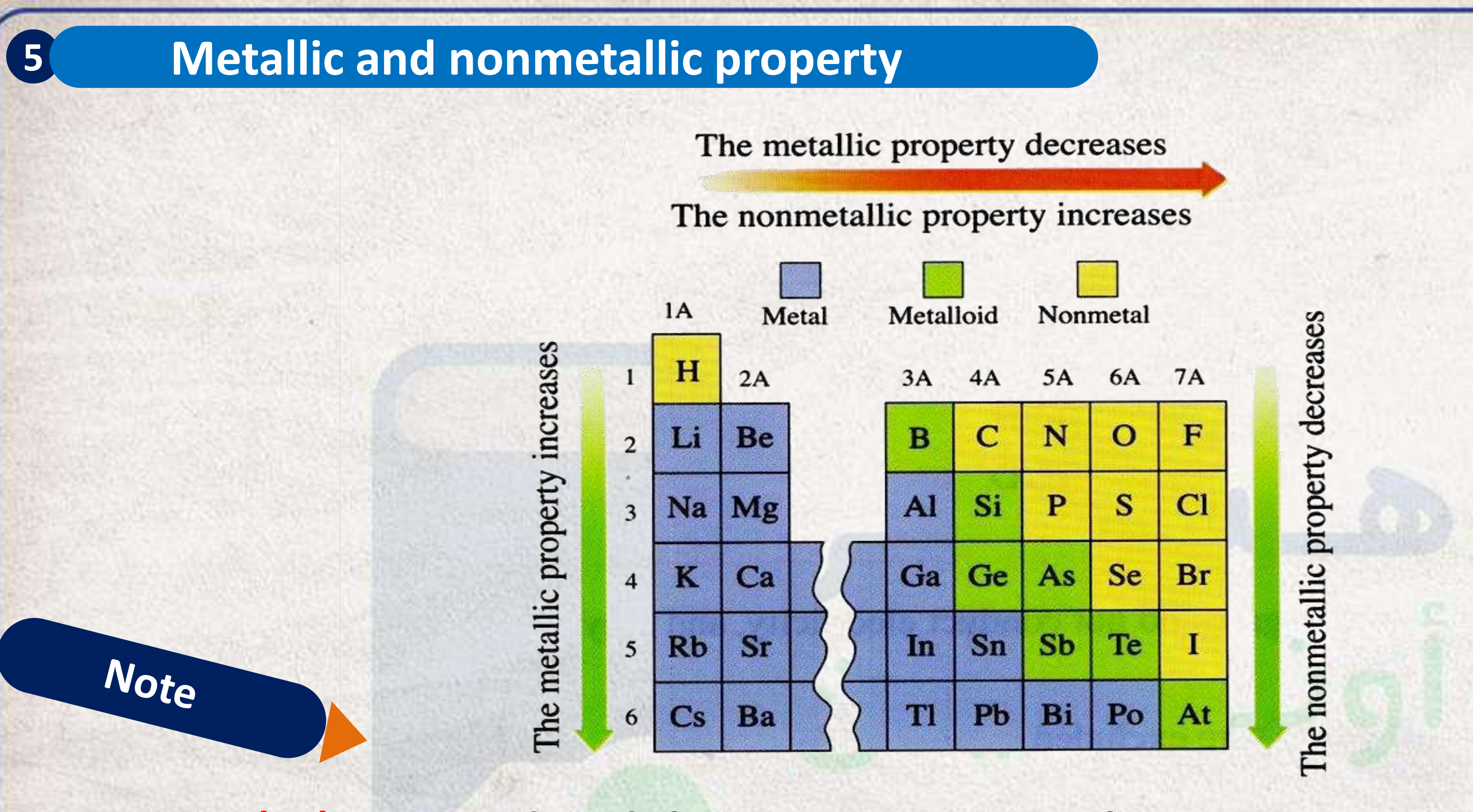
A Metals

B Nonmetals

C Metalloid

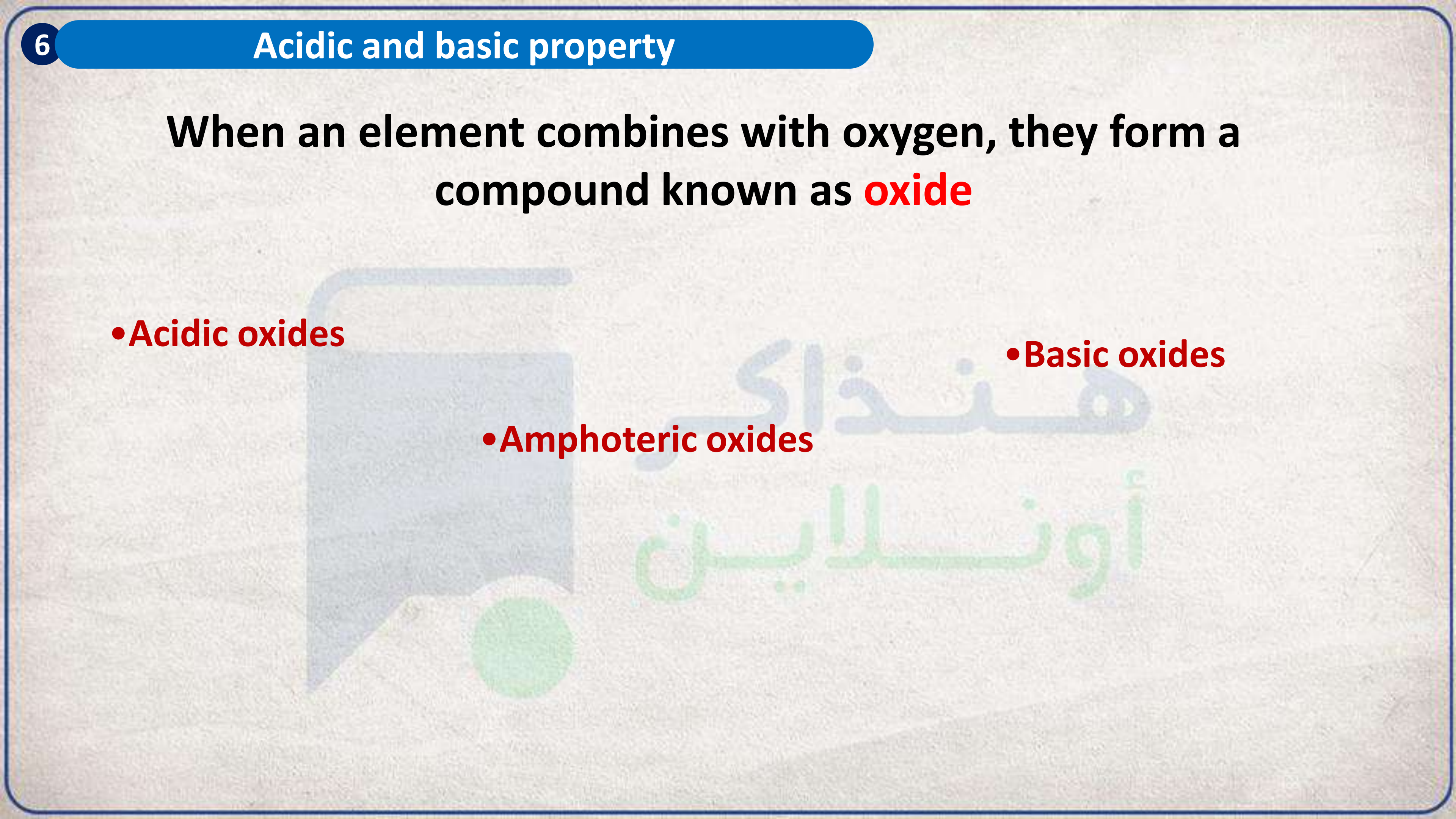


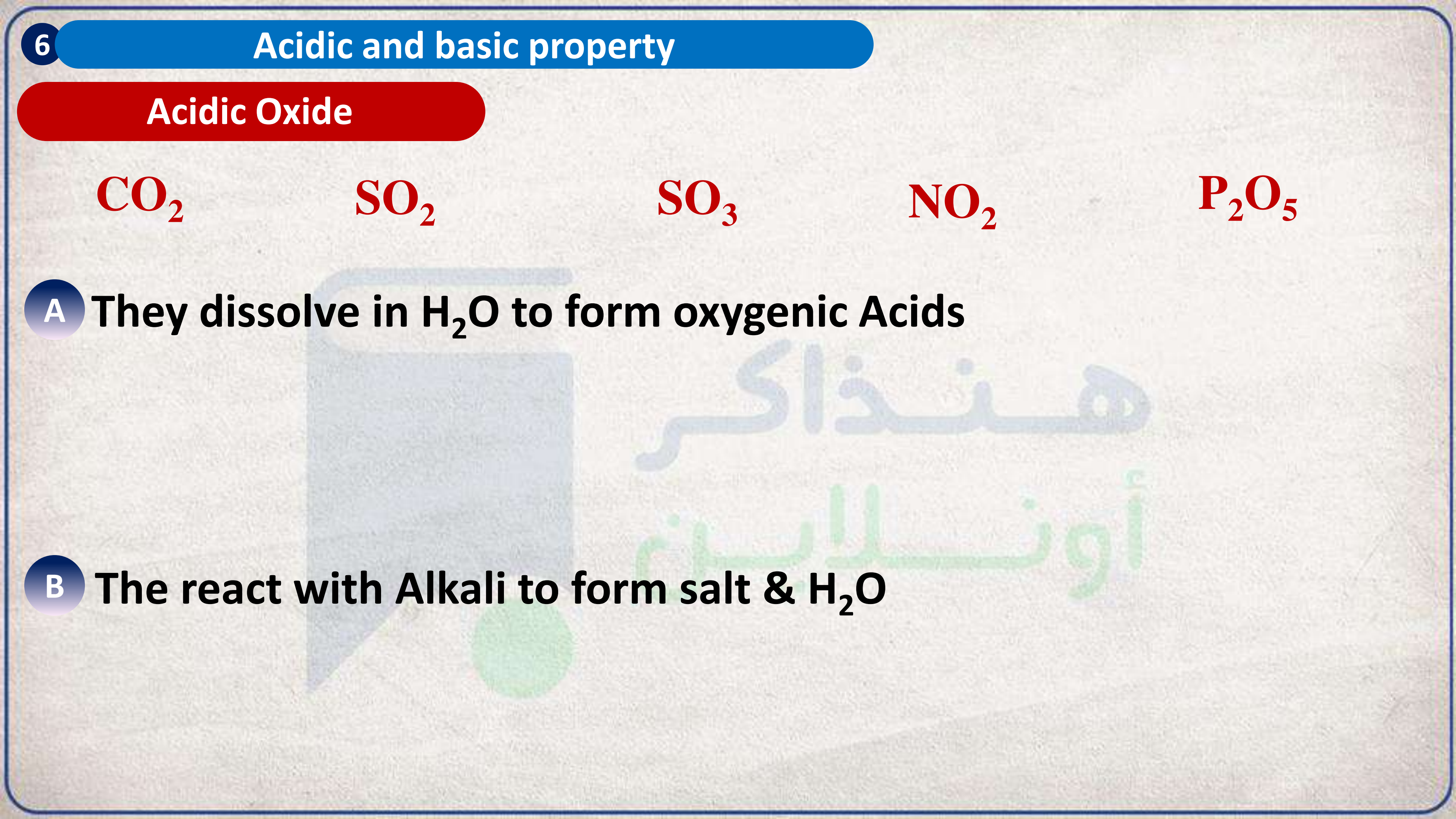
5 Metallic and nonmetallic property

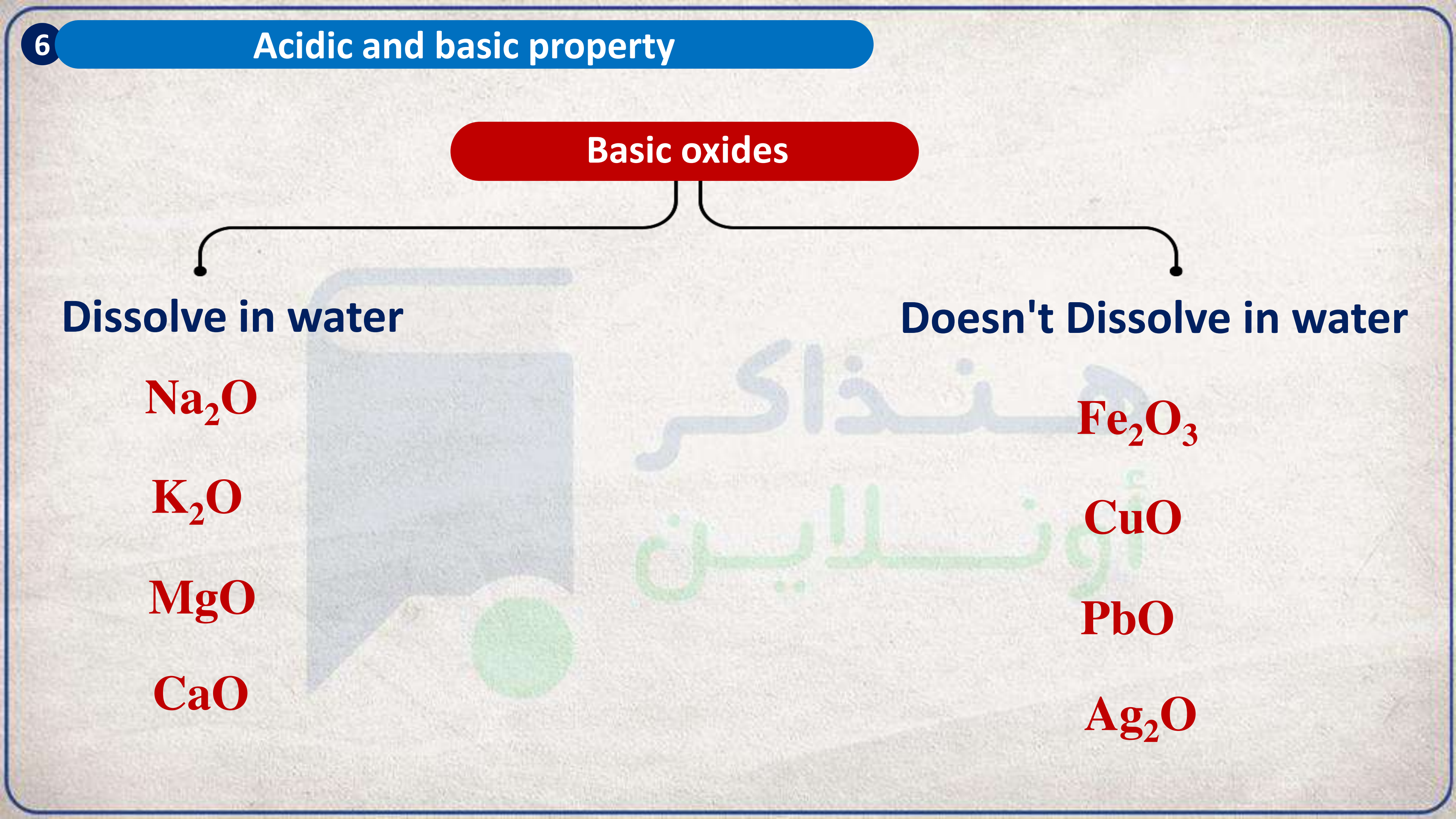


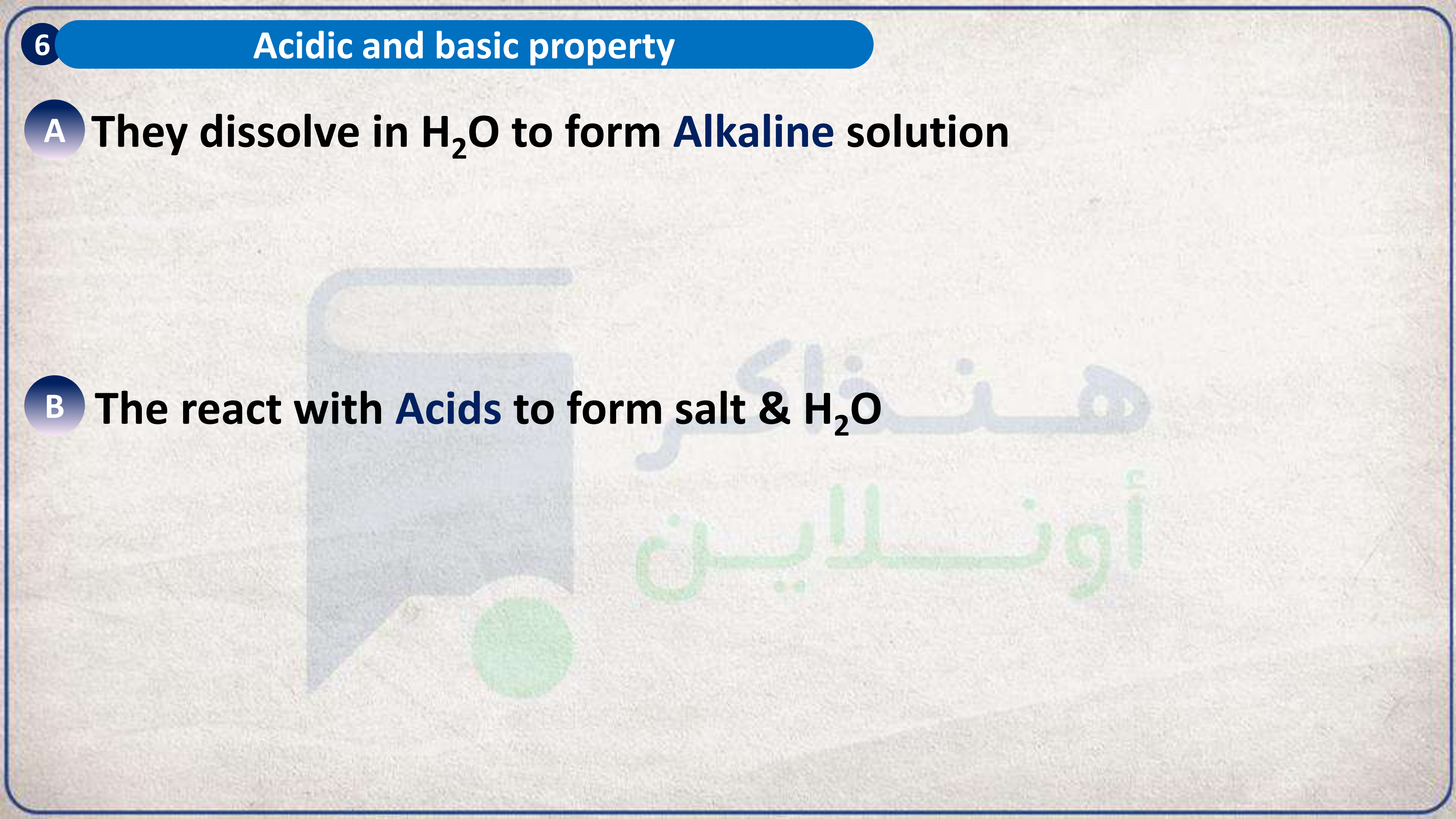
Cesium (Cs) is considered the most active metal

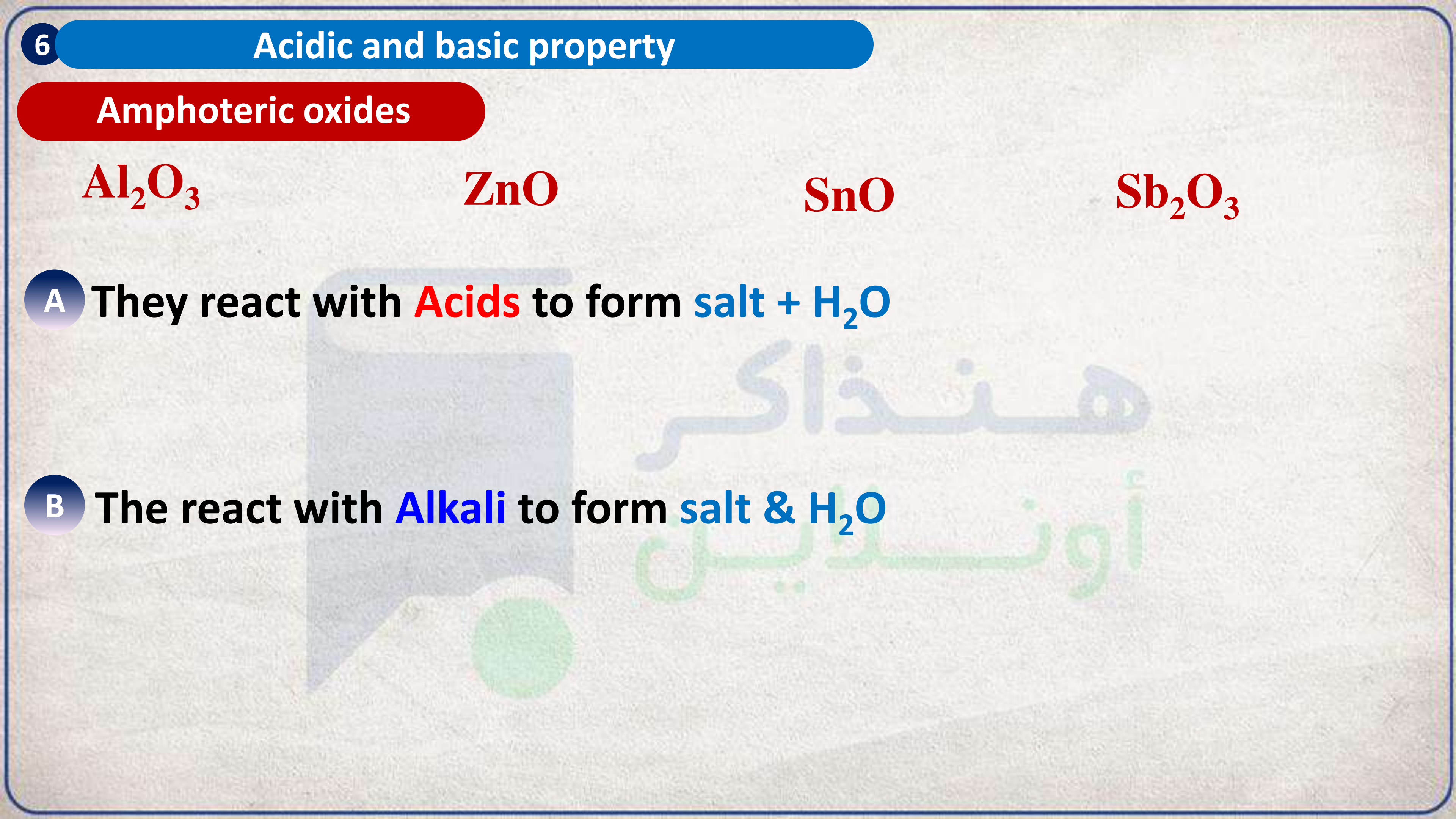
Fluorine (F) is considered the most active nonmetal


6
Acidic and basic property
When an element combines with oxygen, they form a compound known as oxide
•Acidic oxides
•Basic oxides
•Amphoteric oxides
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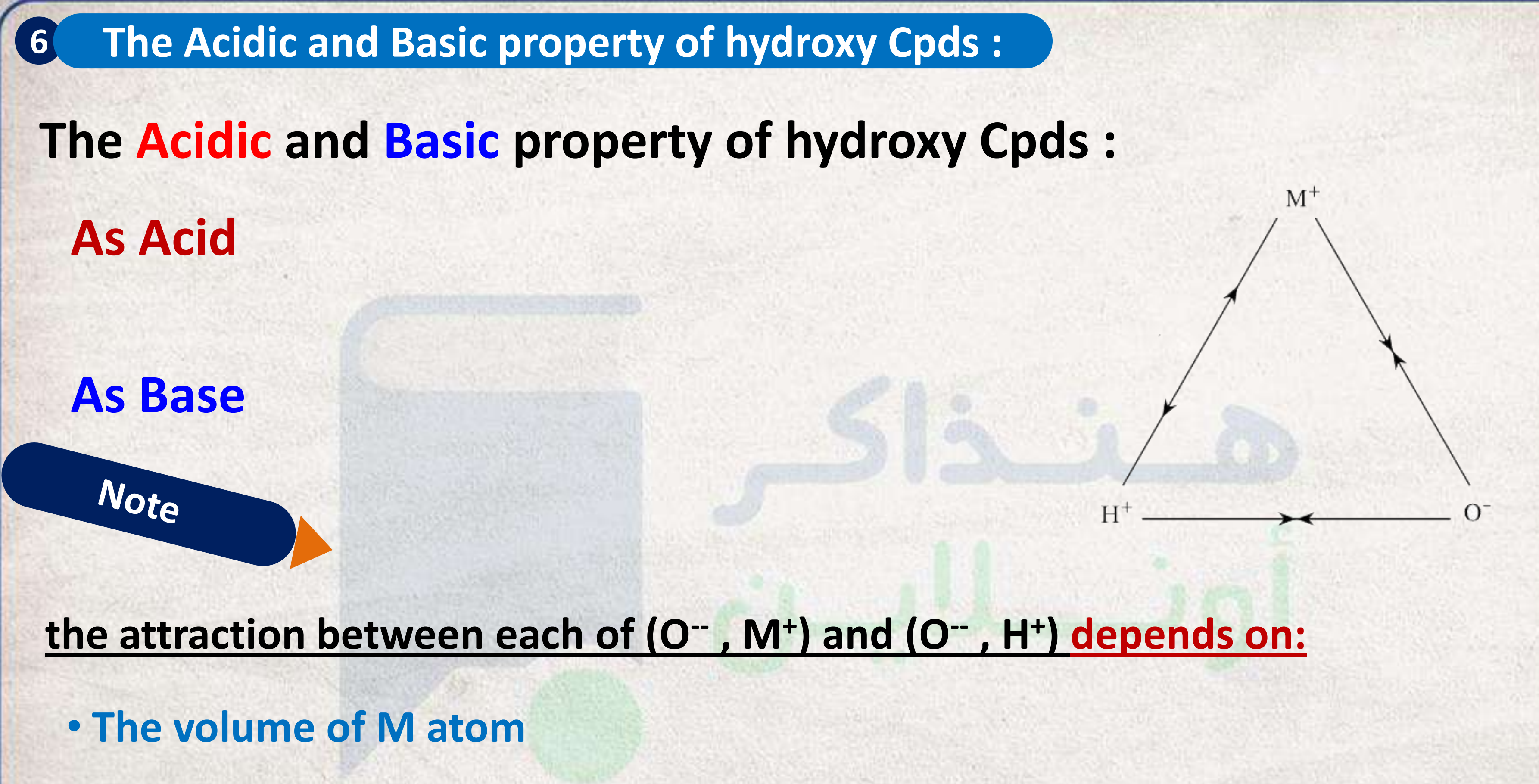

6
Acidic and basic property
Acidic Oxide
CO_2 SO_2 SO_3 NO_2 P_2O_5
A They dissolve in H_2O to form oxygenic Acids
B The react with Alkali to form salt & H_2O


6
Acidic and basic property
Basic oxides
Dissolve in water
Na_2O
K_2O
MgO
CaO
Doesn't Dissolve in water
Fe_2O_3
CuO
PbO
Ag_2O
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6
Acidic and basic property
A They dissolve in H_2O to form Alkaline solution
B The react with Acids to form salt & H_2O


6
Acidic and basic property
Amphoteric oxides
Al_2O_3
ZnO
SnO
Sb_2O_3
A They react with Acids to form salt + H_2O
B The react with Alkali to form salt & H_2O

The Acidic and Basic property of hydroxy Cpds :



As Acid

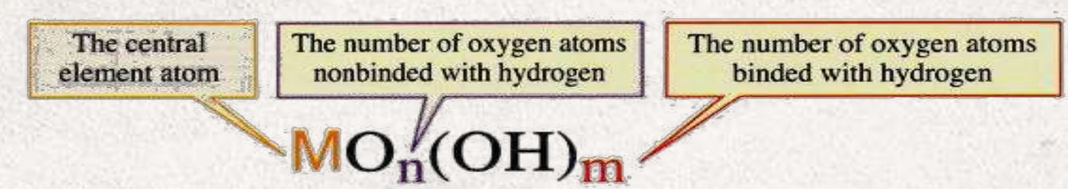
As Base

Note

the attraction between each of (O^{--} , M^+) and (O^{--} , H^+) depends on:

- The volume of M atom
- The charge of M in the compound

The strength of the oxygenated acids (oxyacids)



Oxygenated Acid	H_4SiO_4	H_3PO_4	H_2SO_4	$HClO_4$
Hydroxy formula				
Ratio n : m				
Free Oxygen (non binded)				
Strength of the Acid				

Oxidation Numbers

Oxidation number is a number that refers to the electric charge (positive or negative) that the atom or ion would carry in the compound, whether it is an ionic or a covalent compound.

In ionic compounds	In covalent compounds
Positive oxidation number indicates	
The number of electrons that the atom has lost to give a positive ion (cation)	The shift of the electrons away from the less electronegative atom
Negative oxidation number indicates	
The number of electrons that the atom has gained to give a negative ion (anion)	The shift of the electrons towards the more electronegative atom

Oxidation Numbers

Rule	Application
1. The oxidation number of the element atom in the molecule of similar atoms equals zero, whatever the number of the molecule atoms, because the sharing of electrons between the atoms is equal.	Molecule: Na, Cl_2, P_4, S_8 — Oxidation number of element atom: zero
2. The oxidation number of the element ion equals the charge (valence) of the ion	Ion: Ag^+, Cu^{2+}, Fe^{3+}, Cl^-, O^{2-}, N^{3-} — Oxidation no.: +1, +2, +3, –1, –2, –3
3. The oxidation number of the atomic group equals the charge of the group.	Atomic group: $(NH_4)^+$ Ammonium gp., $(OH)^-$ Hydroxide gp., $(NO_3)^-$ Nitrate gp., $(CO_3)^{2-}$ Carbonate gp., $(SO_4)^{2-}$ Sulphate gp., $(PO_4)^{3-}$ Phosphate gp. — Oxidation no.: +1, –1, –1, –2, –2, –3

Molecule	Na	Cl_2	P_4	S_8
Oxidation number of element atom	zero			

Ion	Ag^+	Cu^{2+}	Fe^{3+}	Cl^-	O^{2-}	N^{3-}
Oxidation no.	+1	+2	+3	–1	–2	–3

Atomic group	$(NH_4)^+$ Ammonium gp.	$(OH)^-$ Hydroxide gp.	$(NO_3)^-$ Nitrate gp.	$(CO_3)^{2-}$ Carbonate gp.	$(SO_4)^{2-}$ Sulphate gp.	$(PO_4)^{3-}$ Phosphate gp.
Oxidation no.	+1	–1	–1	–2	–2	–3

Oxidation Numbers

Rule	Application
4. The oxidation number of any metal in: • Group 1A elements equals +1 • Group 2A elements equals +2 • Group 3A elements equals +3	Compound molecule: KNO_3 | $MgSO_4$ | $AlCl_3$ Oxidation no. of the metal: +1 | +2 | +3
5. The oxidation number of fluorine in all its compounds equals -1	Compound molecule: HF | KF | OF_2 Oxidation no. of fluorine: –1
6.The oxidation numbers of chlorine , bromine and iodine (halogens) in most of their compounds equal (-1)	Compound molecule: $LiCl$ | $NaBr$ | KI Oxidation no. of the halogen: –1

Oxidation Numbers

Rule	Application
7. The oxidation number of oxygen in most of its compounds is -2, while its oxidation number in : • Peroxides equals -1 • Superoxides equals -1/2 • Its compound with fluorine equals +2	(see table below)
8. The oxidation number of hydrogen in most of its compounds is +1 , except in its compounds with active metals which are known as active metal hydrides, its oxidation number is -1	(see table below) Active metal hydrides are ionic compounds formed from the combination of an active metal with hydrogen in which hydrogen has an oxidation number -1 (negative ion).
9. The algebraic summation of the oxidation numbers of the different atoms in the molecule equals zero.	In sodium chloride molecule NaCl : The oxidation no. of Na (+1) The oxidation no. of Cl (-1) = zero

Oxide	Normal oxide	Peroxide		Super-oxide	With fluorine
Formula	Na_2O	H_2O_2	Na_2O_2	KO_2	OF_2
Oxidation no. of oxygen	-2	-1		$-\frac{1}{2}$	$+2$

Compound molecule	HCl	NaH	CaH_2	AlH_3
Oxidation no. of hydrogen	$+1$	-1	-1	-1

Oxidation Numbers

10. The algebraic summation of the oxidation numbers of the atomic groups forming the molecule equals zero	In the molecule $[NH_4]^+[NO_2]^-$: The oxidation no. of ammonium group (+1) &The oxidation no. of nitrite group (-1) = zero
11. The algebraic summation of the oxidation numbers of the different atoms in an atomic group equals the charge of the group.	In hydroxide group OH^- : The oxidation no. of oxygen (-2) &The oxidation no. of hydrogen (+1) = -1

Note

Hydrogen gas evolves	
At the anode (the positive electrode) during the electrolysis of sodium hydride melt	At the cathode (the negative electrode) during the electrolysis of the acidified water
Because	
The oxidation number of hydrogen in sodium hydride NaH melt is (-1)	The oxidation number of hydrogen in acidified water H_2O is (+1)

Oxidation - reduction reaction (Redox)

It's the reaction in which the electrons are transferred from one reactant to another

Oxidation

Recent : Loss of e,s leads to :
increase the +ve charge or
decrease the –ve charge

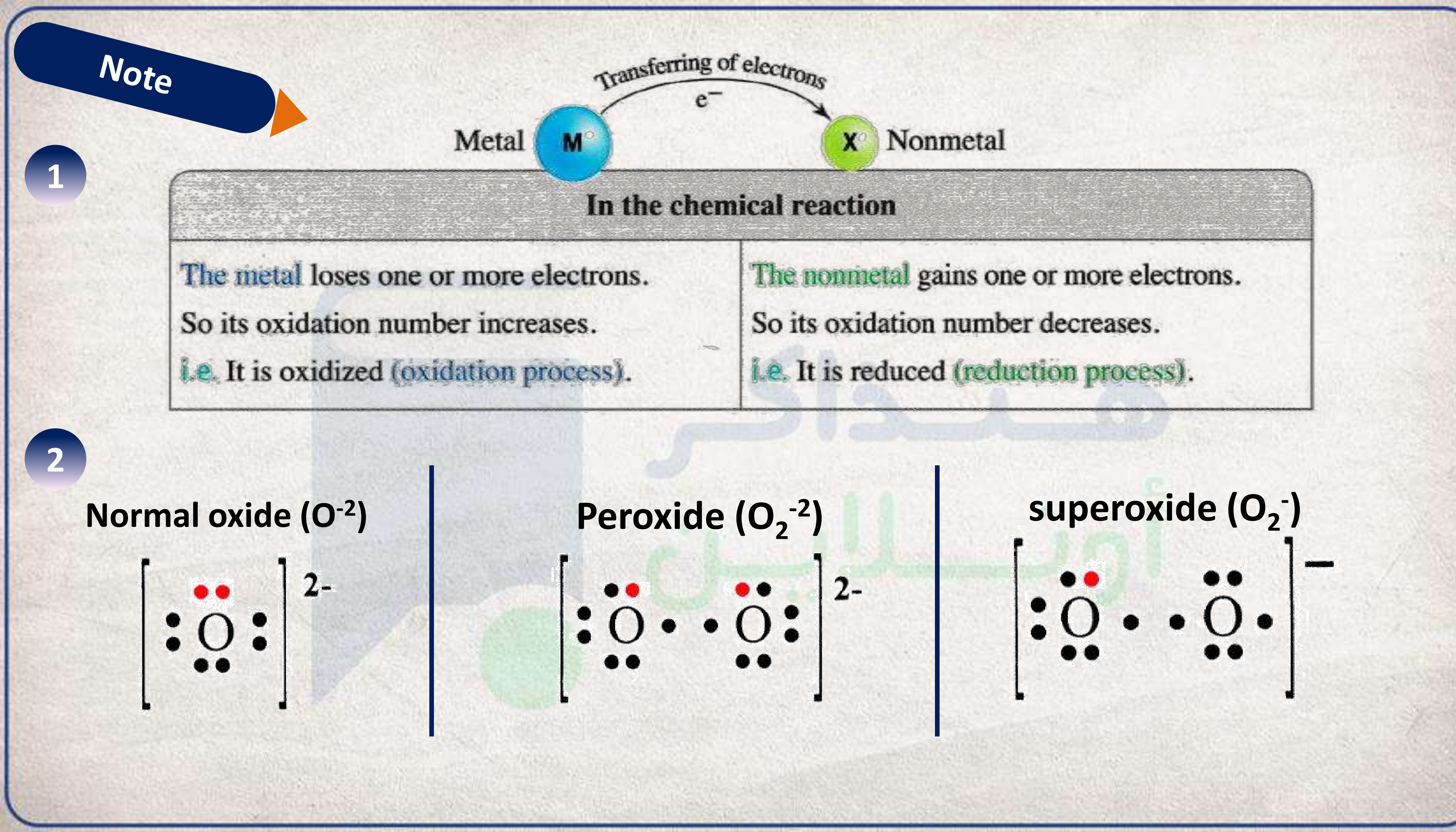
1. $Na \longrightarrow Na^{+} + e^{-}$
2. $Zn \longrightarrow Zn^{+2} + 2e^{-}$
3. $Fe^{+2} \longrightarrow Fe^{+3} + e^{-}$
4. $2Cl^{-} \longrightarrow Cl_2 + 2e^{-}$

Reduction

Recent : Gain or accept of e,s lead to :
decrease the +ve charge or
increase the –ve charge

1. $Cu^{+2} + 2e^{-} \longrightarrow Cu$
2. $Fe^{+3} + e^{-} \longrightarrow Fe^{+2}$
3. $Mn^{+7} + \quad \longrightarrow Mn^{+2}$
4. $Br_2 + 2e^{-} \longrightarrow$

$$Zn_{(s)} + CuSO_{4(aq)} \longrightarrow ZnSO_{4(aq)} + Cu_{(s)}$$


Note
1
Transferring of electrons
e^-
Metal
M
X
Nonmetal
In the chemical reaction
The metal loses one or more electrons.
So its oxidation number increases.
i.e. It is oxidized (oxidation process).
The nonmetal gains one or more electrons.
So its oxidation number decreases.
i.e. It is reduced (reduction process).
2
Normal oxide (O^{-2})
Peroxide (O_2^{-2})
superoxide (O_2^{-})
O
2-
O O
2-
O O
−



The nucleus of manganese atom Mn contains 25 protons. What is the electron configuration of manganese in $Mn_3(PO_4)_2$?

- [Ar] , $3d^6$
- [Ar] , $3d^5$
- [Ar] , $3d^3$, $4s^2$
- [Ar] , $3d^5$, $4s^2$



What are the two ions which from the compound K_3P ?

- K^+ , P^{-3}
- K^+ , P^-
- K^{+3} , P^-
- K^{+3} , P^{-3}

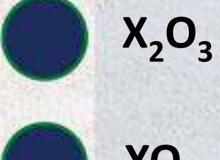


In the equation : $4Al + 3O_2 \rightarrow 2Al_2O_3$, when aluminum atoms lose 12 mol of electrons , so oxygen atoms

- again 4 mol of electrons.
- lose 4 mol of electrons
- gain 12 mol of electrons.
- lose 12 mol of electrons



The opposite figure represents the I.P of element (X) , the probable chemical formula when (X) combine with Oxygen is ……



X_2O_3



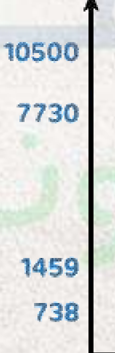
XO



XO_2



X_2O





Which of the following changes represents neither an oxidation nor a reduction reaction?

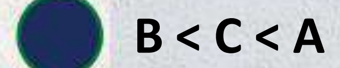
- $CO_2 \rightarrow CO$
- $N_2O_4 \rightarrow NO_2$
- $ClO^- \rightarrow ClO_3^{-2}$
- $V_2O_3 \rightarrow V_2O_5$



The next table shows , the ionization potentials of three metals A, B and C in the same Element period in the modern periodic table.

What is the proper graduation of the metallic character of these elements?

Element	A	B	C
Ionization potential (kJ/mol)	2800	1500	700



- B < C < A
- A < C < B
- C < B < A
- A < B < C



What are the oxidizing and the reducing agents in the reaction : $2H_2S + SO_2 \rightarrow 2H_2O + 3S$?



	Oxidizing agent	Reducing agent
A	SO_2	S
B	H_2S	SO_4
C	S	H_2S
D	SO_2	H_2S



What is the total number of electrons in the anion (SO_4)$^{-2}$?

[S = 16 , O = 8]

- $48\ e^-$
- $50\ e^-$
- $46\ e^-$
- $52\ e^-$



An element at which the atomic 30 is located in the modern periodic in

- Third period and group IB
- Fourth period and group 1B
- Fourth period and group IIB
- Third cycle and group 1B



The best reducing agents are the following

- a sodium atom Na_{11}
- Sodium ion Na^{+}_{11}
- Potassium ion K^{+}_{19}
- Chlorine atom Cl_{17}



Which quantum numbers represent the orbitals that are filled successively with electrons in the elements $_{21}Sc$ to $_{30}Zn$?

- $n = 3, \ell = 1$
- $n = 3, \ell = 2$
- $n = 4, \ell = 1$
- $n = 4, \ell = 2$



The bond length in chromium III oxide (Cr_2O_3)... The bond length in chromium II oxide (CrO)

- larger
- Equal
- smaller than
- double



Among the oxygenated acids are:

$HBrO_3$, $HBrO_2$, $HBrO$

Which of the following is correct for these acids?

- HBrO is the weakest acid among these three acids
- The oxidation number of bromine in $HBrO_3$ is equal to (-1)
- $HBrO_2$ is the strongest acid among these three acids.
- The ratio (n: m) in HBrO equals (1:1)



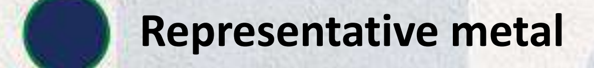
If you know that element A precedes element B in the same period and element A precedes element C in the same group, the order of these elements according to their radii is

- B > A > C
- A > C > B
- A > C > B
- C > A > B



An atom in which the last electron has the quantum numbers shown in the following table:

n	3
ℓ	1
m_l	0
m_s	-½



- Representative metal
- Nobel gas
- representative nonmetal
- main transition element



if element (X) form the compounds (X_2O_3), (XCl_3) then element (X) is in the group……. Periodic Table

- 7A
- 2A
- 3A
- 6A



What is the type of the element whose atom has an electronic configuration ends with $4F^{14}$, $5d^{9}$, $6s^{1}$?

- An inner transition element.
- A representative element.
- A main transition element.
- A noble element.



What is the total number of the inner transition elements in both the fourth and the fifth periods in the periodic table?

- 0
- 24
- 14
- 32



Two elements (X) and (Z) are located in group 6A, if the element (X) is located in the third period, and the element (Z) is located in the fifth period

What is the atomic number of the element (Y) which lies between them in the same group?

- 31
- 32
- 33
- 34



The atomic radius of fluorine $_{9}F$ is smaller than that of carbon $_{6}C$, because:

- the quantum numbers of the electrons of F are smaller than those of C
- fluorine is heavier than carbon.
- the effective nuclear charge of fluorine is larger than that of carbon.
- the repulsion between the electrons of the completely filled orbitals is stronger than that between the electrons of the half filled orbitals.



The following graph determines the relation between the number of electrons in the p sublevel and its magnetic quantum number

Magnetic Quantum No
No of Electrons

Magnetic Quantum No
No of Electrons

Magnetic Quantum No
No of Electrons

Magnetic Quantum No
No of Electrons



What happens on **moving down** the group of halogens from fluorine to iodine?

- The ionic radius increases.
- The atomic number of the halogen decreases.
- The atomic radius decreases
- The number of the valence electrons in the halogen atom increases.



In the equation : $X_{(g)}$ + Energy → $X_{(g)}^{+}$ + e^{-} , The **absorbed** energy is……………

- less than the difference in energy between the outermost energy level and the level Q
- equal to the difference in energy between the outermost energy level and the level Q
- larger than the difference in energy between the outermost energy level and the level Q
- half the difference in energy between the outermost energy level and the level Q



The atom of the metal R is similar to its ion R^{+2} in........

- the size.
- the radius.
- the charge of the nucleus.
- the number of the electrons.



Which of the following elements is in the same period of silicon ($_{14}Si$)

- $_{32}Ga$
- $_{21}Sc$
- $_{11}Na$
- $_{38}Sr$



The mass ratio of the constituents elements in glucose $C_6H_{12}O_6$ and this agrees with ……….model [C = 12 , O = 16 , H = 1]

- 1 : 2: 1 , Dalton
- 1 : 2: 1 , Bohr
- 6 : 1: 8 , Dalton
- 12 : 2 : 16 , Rutherford



An atom in which the last electron has the quantum numbers shown in the following table:



- Representative metal
- Nobel gas
- representative nonmetal
- main transition element

n	3
ℓ	1
m_ℓ	0
m_s	-½



the group with the **highest** electronegativity ends with the E.C :

- ns^2 , np^1
- ns^2 , np^2
- ns^2 , np^3
- ns^2 , np^5



The last electron in the potassium atom $_{19}K$, is different from the last electron in the sodium atom, $_{11}Na$

- Principal quantum number
- Spin quantum number
- Subsidery quantum number
- magnetic quantum number



Chlorine replaces iodide ion in potassium iodide solution according to the equation What is the **oxidizing agent** in this reaction ?

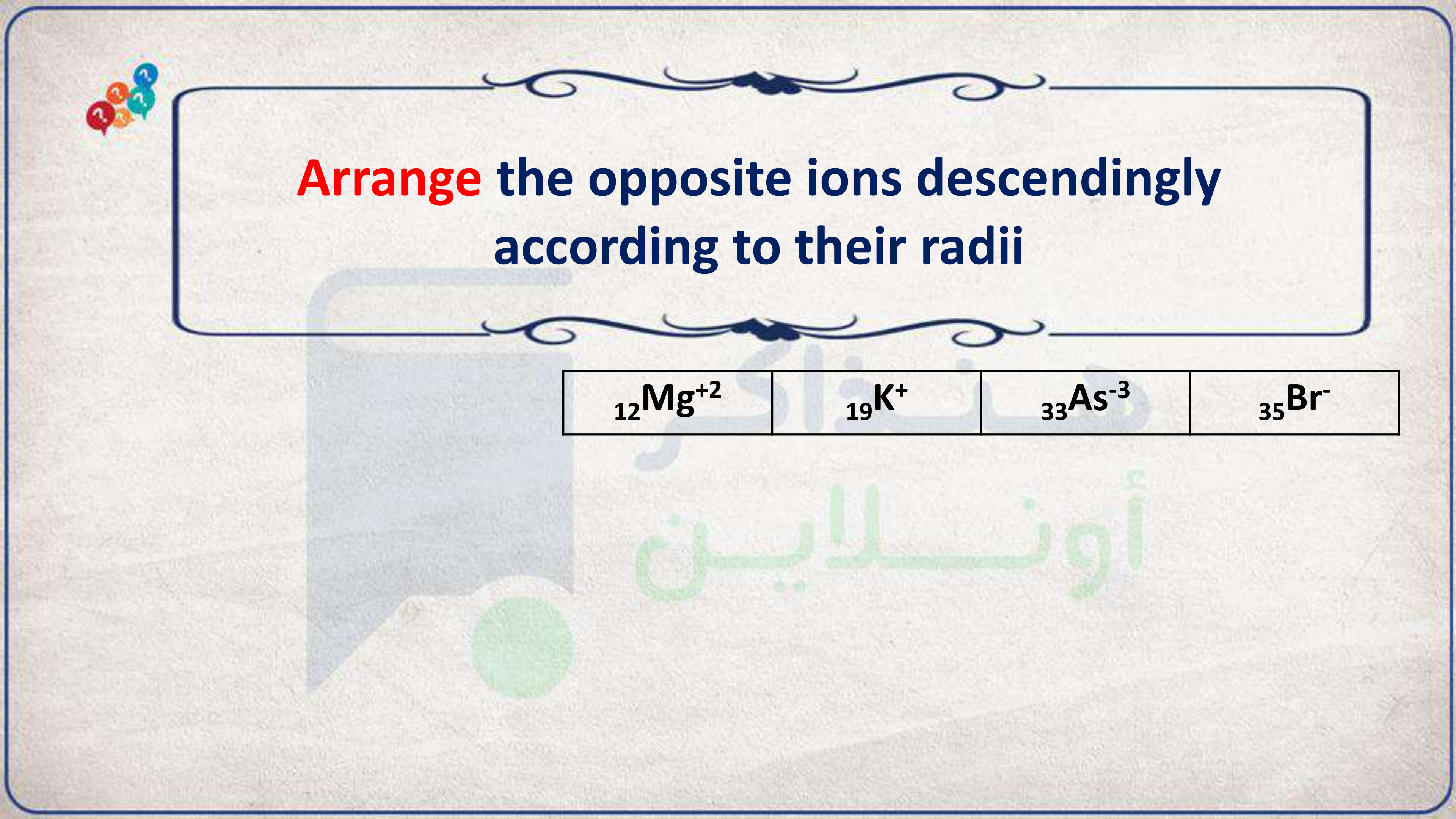
$$Cl_2 + 2I^- \longrightarrow I_2 + 2Cl^-$$

- chloride ions.
- Chlorine gas. ✓
- Iodide ions.
- Iodine vapours.



Which of the following equations is incorrect

- $Na^{+} + e^{-} \longrightarrow Na + Energy$
- $H_2 + Energy \longrightarrow 2H^{+} + 2e^{-}$
- $Na + e^{-} \longrightarrow Na^{+} + Energy$
- $Mg + Energy \longrightarrow Mg^{2+} + 2e^{-}$


Arrange the opposite ions descendingly according to their radii
$_{12}Mg^{+2}$
$_{19}K^{+}$
$_{33}As^{-3}$
$_{35}Br^{-}$



Is it possible that the sublevel 3d in each of the atoms of 2 elements in the fourth period contains 5 single (unpaired) electrons ?



Calculate the oxidation number of

(1) Chlorine in: Cl_2

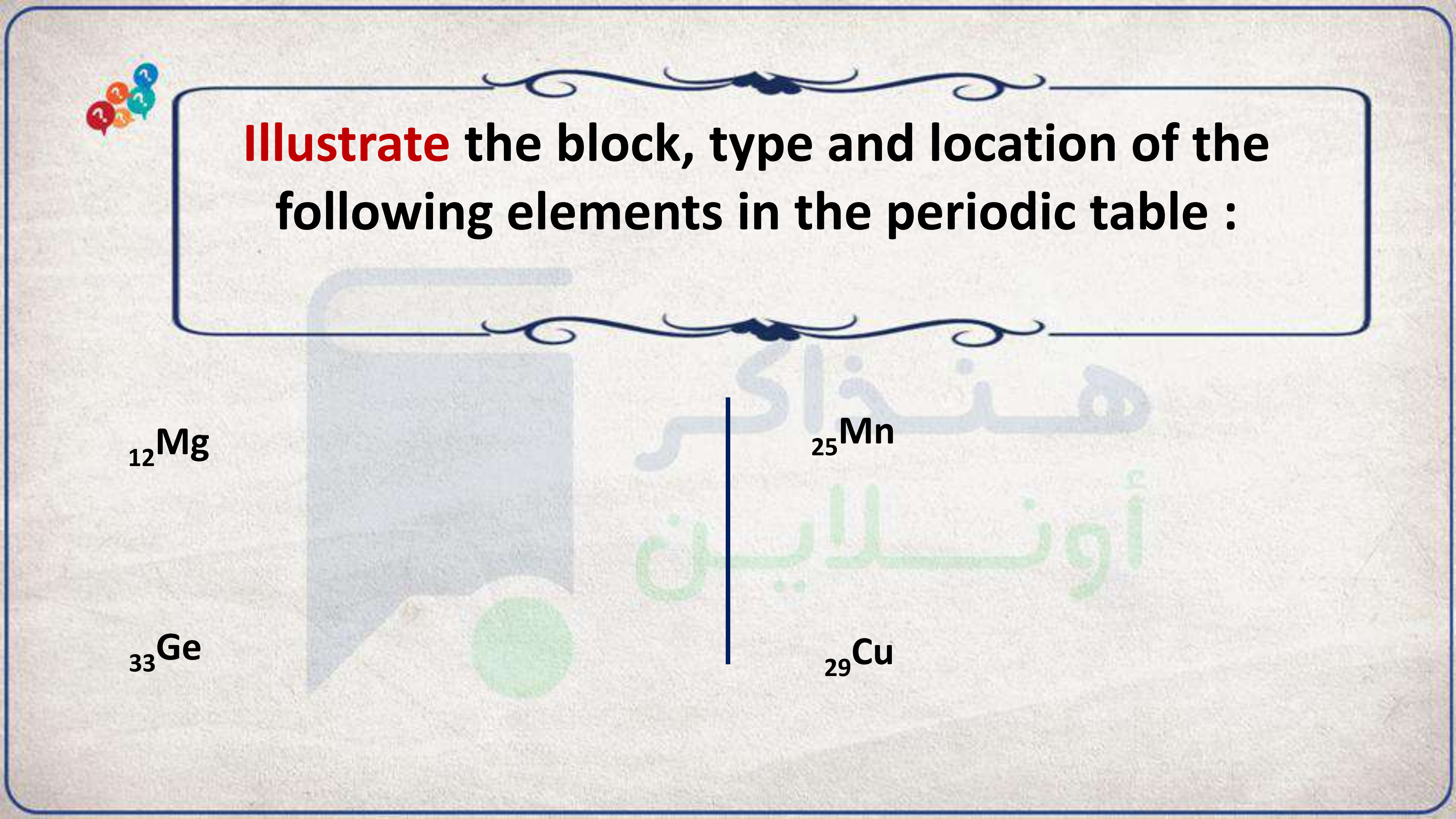
(2) P in : $(PO_4)^{-3}$

(3) Iron in: $Fe_2(SO_4)_3$

(4) Nitrogen in : $(NH_4)^+$ / $(NO_2)^-$

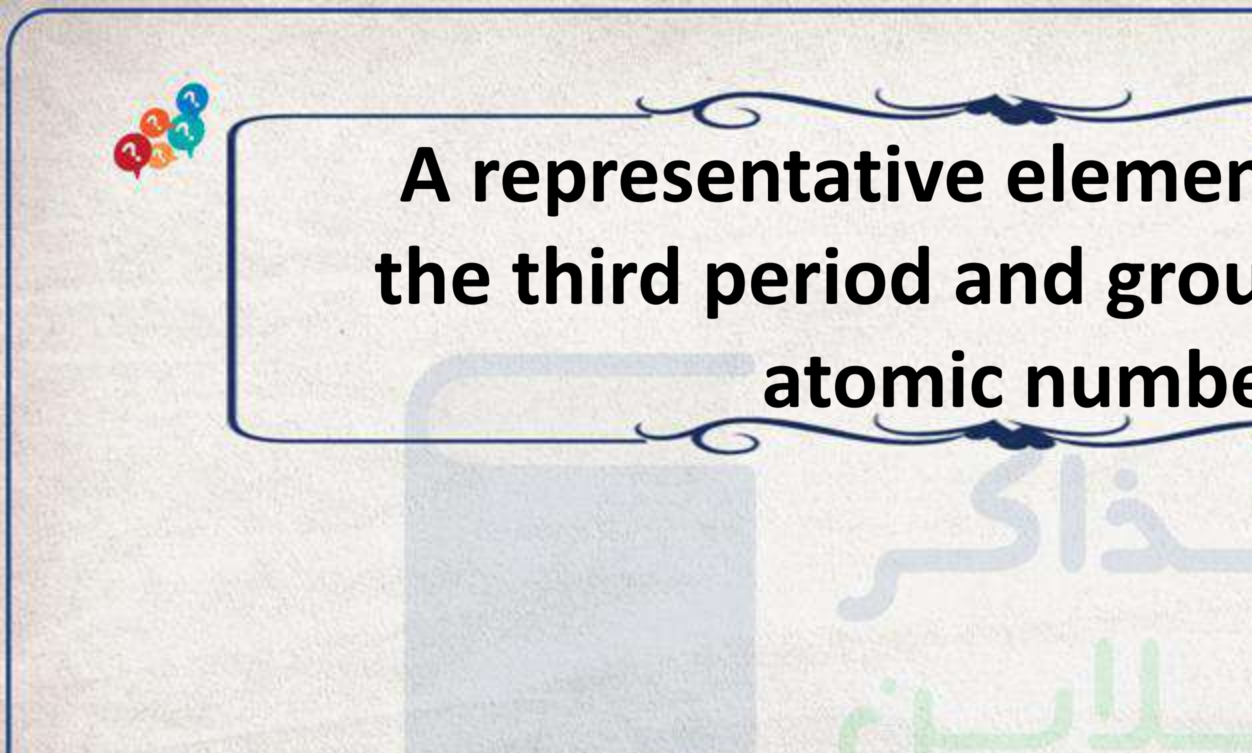
(5) bromine in : $KBrO_4$

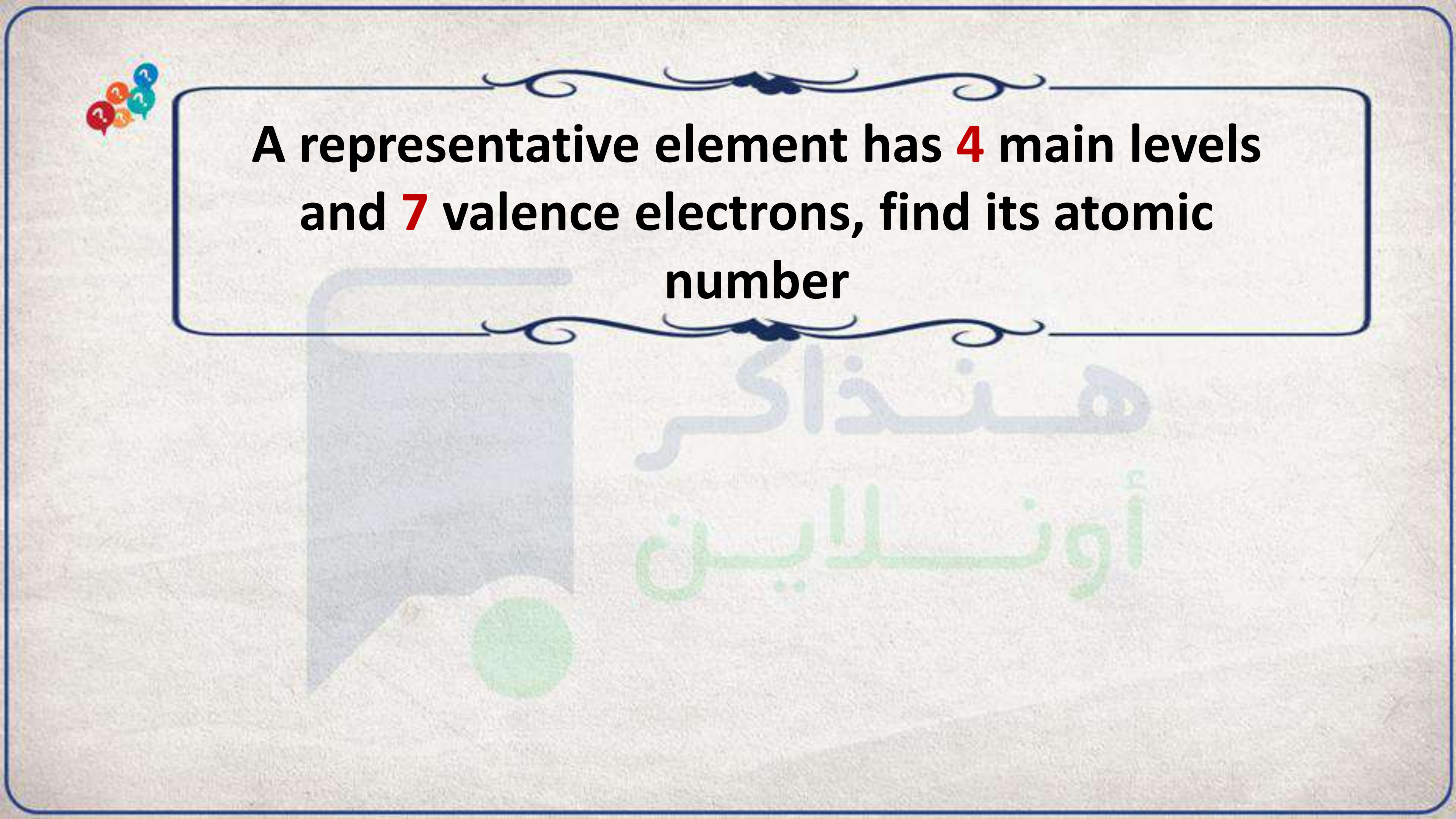
(6) Sulphur in : $Na_2S_4O_6$



Illustrate the block, type and location of the following elements in the periodic table :
$_{12}Mg$
$_{33}Ge$
$_{25}Mn$
$_{29}Cu$

A representative element located in the third period and group 5A find its atomic number




A representative element has 4 main levels and 7 valence electrons, find its atomic number



Arrange the following cpds acc. to length of bonds

NH_3 , H_2O , CH_4



An element has 3 principle E.L and the number of electrons in the third level is equal to the number of electrons in the first level find its atomic number



In the following scheme

1- Write the chemical formula of the two compounds (X) and (Y).

2- Write the symbolic equation which represents the reaction of (X) with (Y) to form the salt (Z).

Mg + O_2 → ……(X)……

SO_3 + H_2O → ……(Y)……

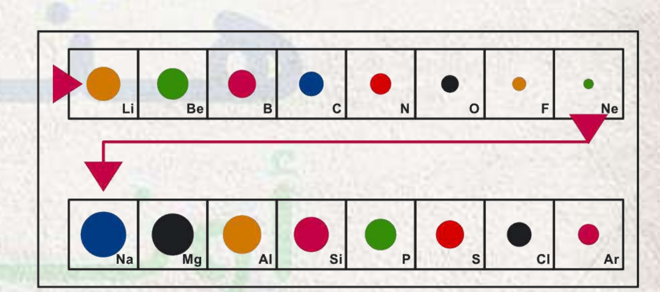
(X) + (Y) → ……(Z)…… + H_2O



If you know that :

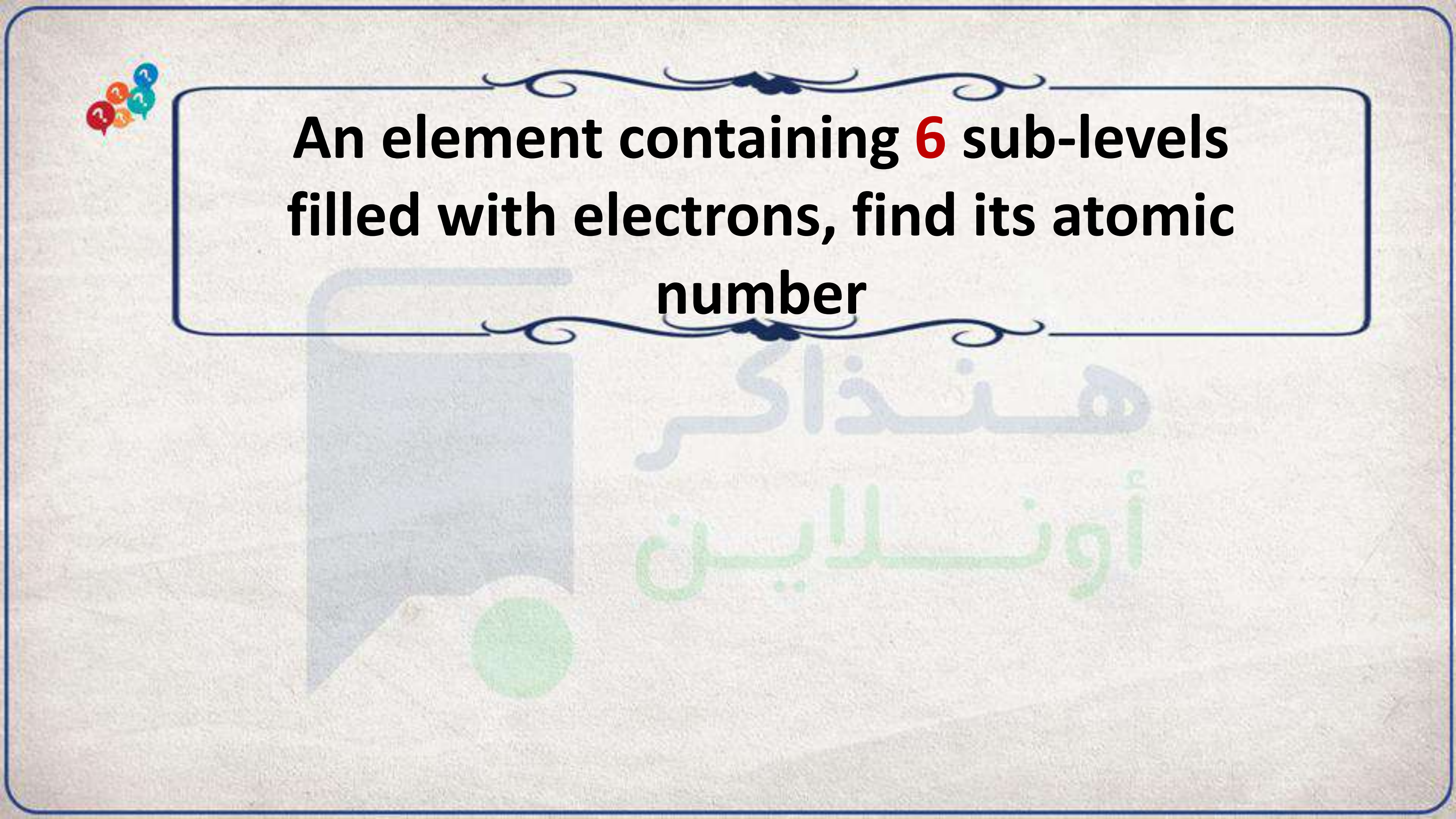
The bond length in chlorine molecule Cl_2 is 1.98 A ,The bond length between carbon and chlorine atoms (C - Cl) in carbon tetrachloride CCl_4 is 1.76

What is the atomic radius Of carbon atom ?





the E.C of the two ions of zinc $_{30}Zn$ and copper $_{29}Cu$ elements in case of their **similarity**


An element containing 6 sub-levels filled with electrons, find its atomic number
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The electron configuration of the element (X) ends with the sublevel $4s^1$ What is the product of ionization of XOH in water ? Explain.



(X) is element whose electronic Conf. is $1s^2$, $2s^2$, $2p^6$, $3s^2$, $3p^2$ **Find** the electronic Conf. of the element that lies after (X) has **similar** properties



Write the electronic configuration and atomic number, the period and group of an element whose last electron in its sublevel has the following quantum numbers

($n = 3$, $\ell = 1$, $m_\ell = 1$, $m_s = +\frac{1}{2}$)

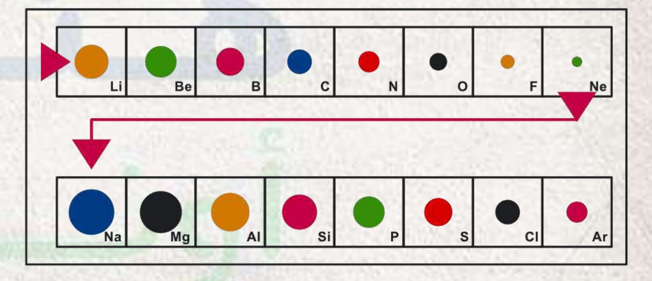


Determine the four quantum numbers of the last electron as well as the period and group number of the element lanthanum $_{57}La$



If you have the following values (1.98 / 1.28 / 2.66 / 2.28) in Angstroms which represent the bond length in the following molecules

(Br_2 / Cl_2 / F_2 / I_2) in no order , find the radius of iodine atom



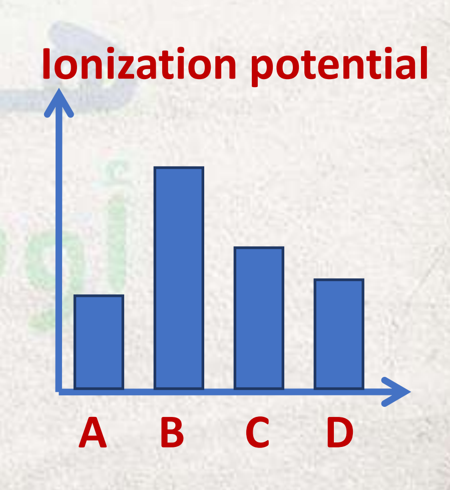


Explain oxidation and reduction in the following equation :

$$2K_2CO_{3(s)} + 3O_{2(g)} \longrightarrow 4KO_{2(s)} + 2CO_{2(g)}$$



The next graph represents the value of the first ionization potential for 4 elements In no order: Neon $_{10}Ne$, nitrogen $_{7}N$, oxygen $_{8}O$, potassium $_{19}K$ Which of these symbols represents the potassium and which represents the nitrogen?





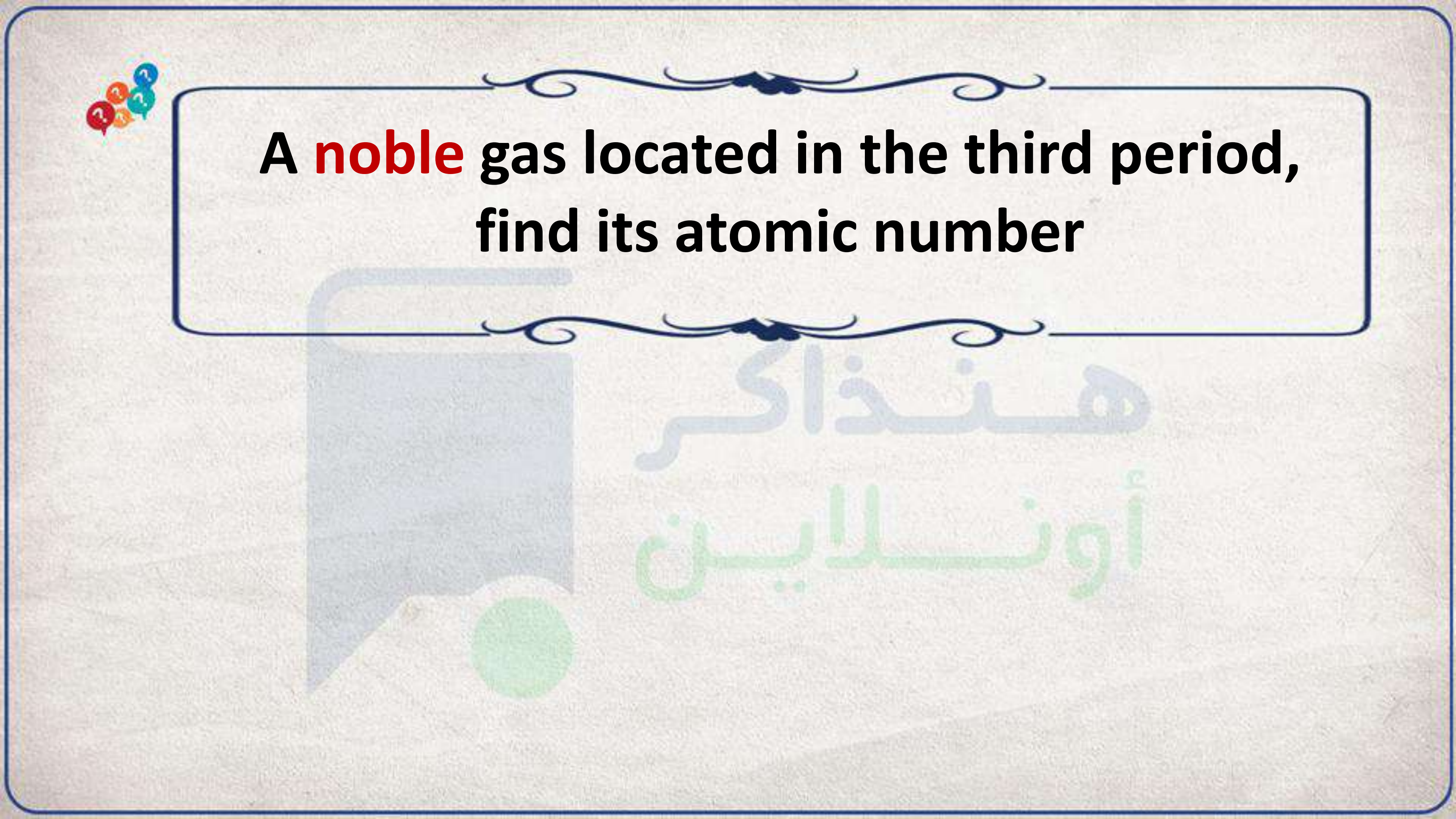
Explain the type of change (oxidation or reduction) that occurred to each of iron and carbon in the following reaction : $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

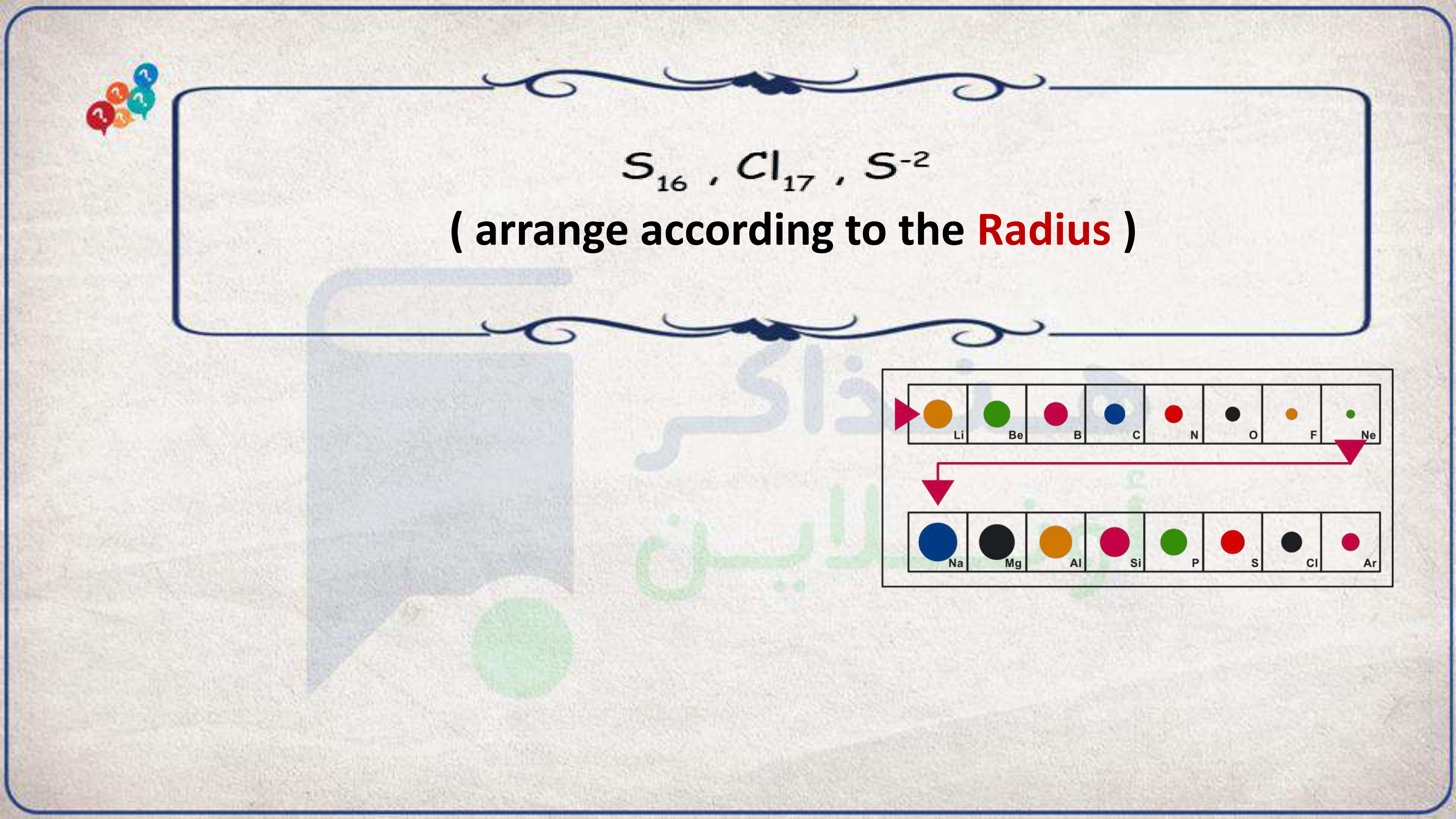


Explain the change (whether oxidation or reduction) that occurred to each of **chromium** and **iron** in the following reaction :

$$K_2Cr_2O_7 + 6FeCl_2 + 14HCl \rightarrow 2KCl + 2CrCl_3 + 6FeCl_3 + 7H_2O$$



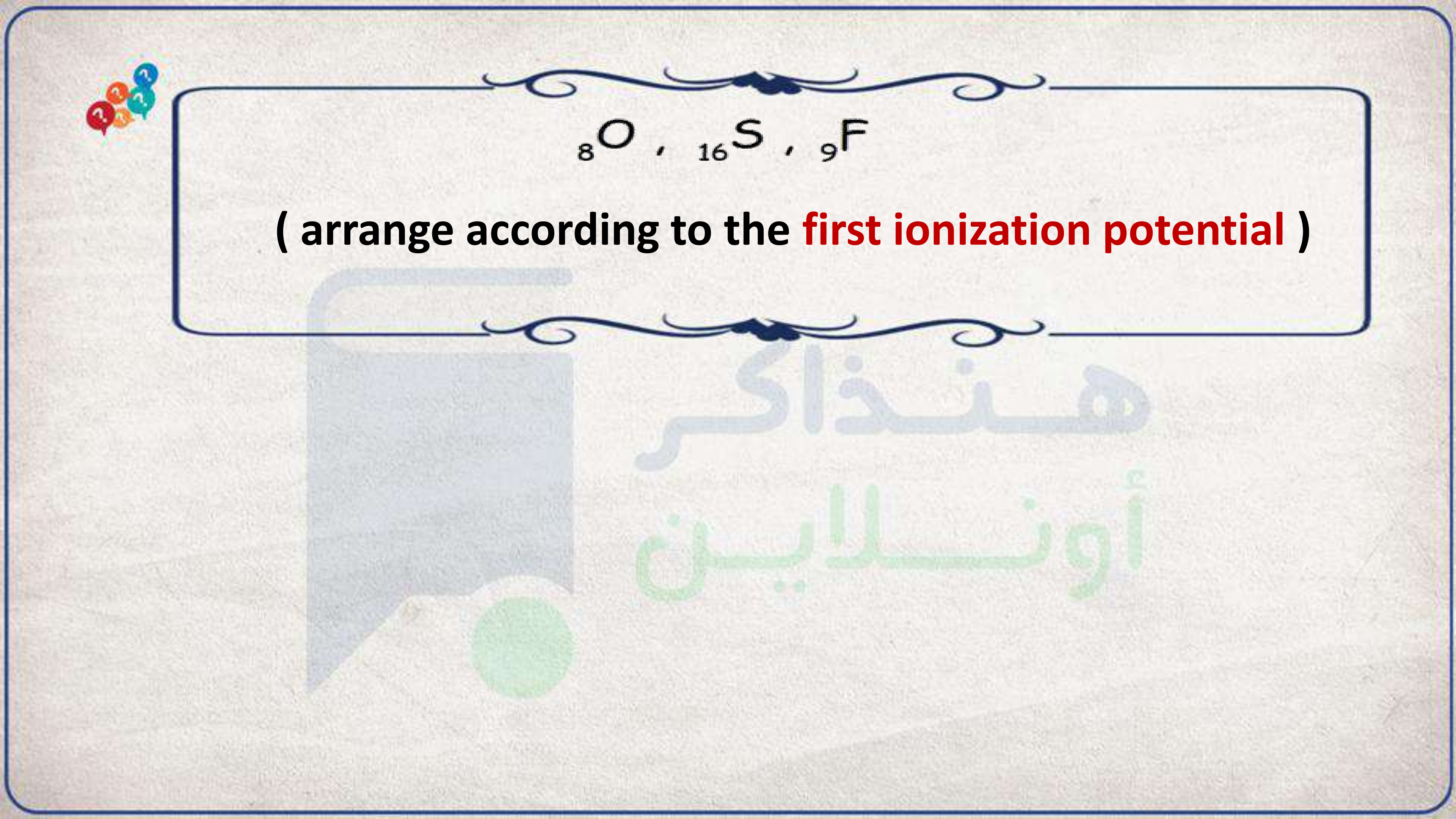

A noble gas located in the third period,
find its atomic number
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S_{16} , Cl_{17} , S^{-2}
(arrange according to the Radius)
Li
Be
B
C
N
O
F
Ne
Na
Mg
Al
Si
P
S
Cl
Ar

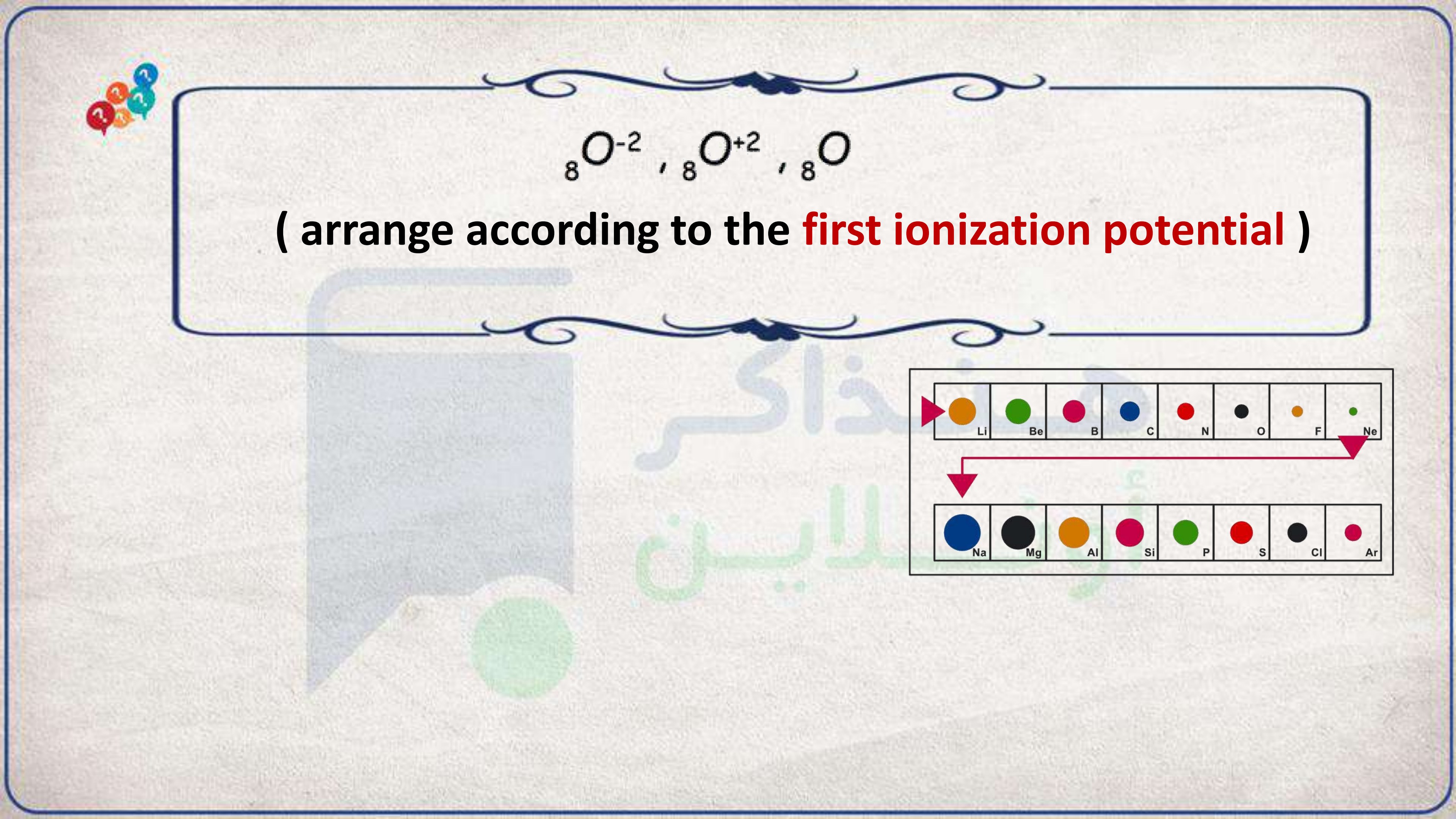


A main transition element is located in the 5th period and group 5B , find its atomic number


$_{8}O$, $_{16}S$, $_{9}F$
(arrange according to the first ionization potential)
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أونلاين



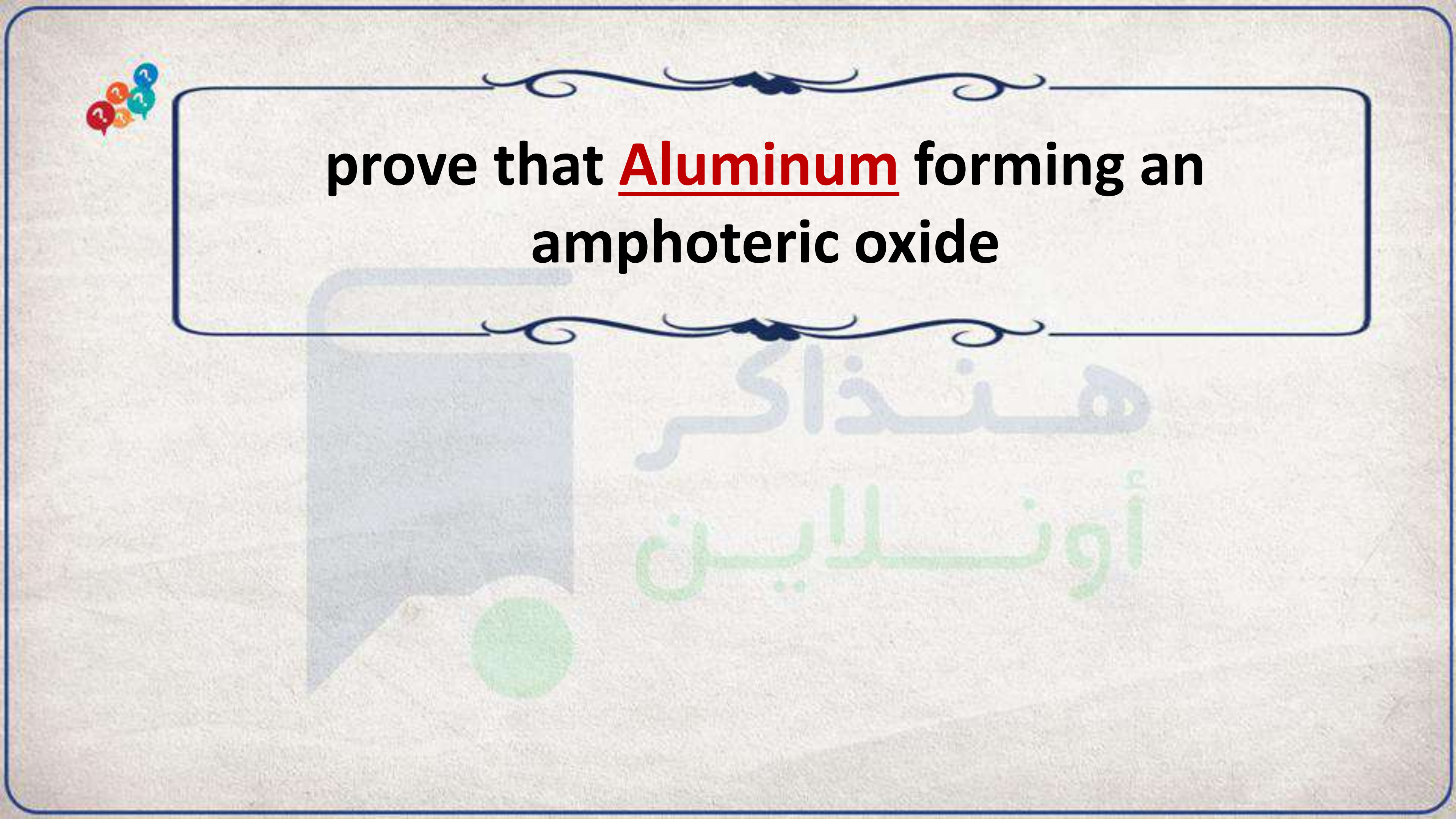
A major transition element is located in the 4th period and group 7B , find its atomic number

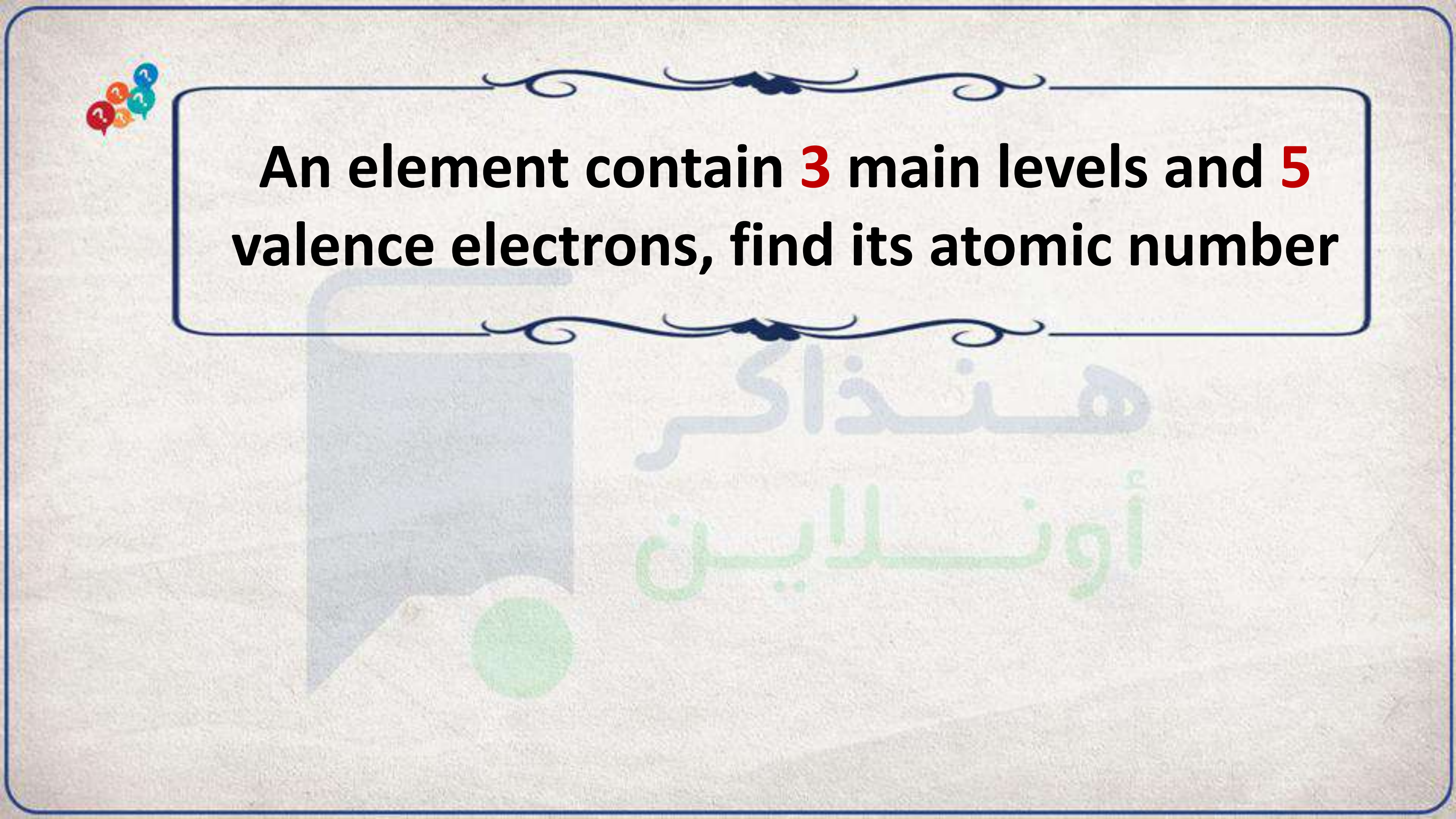


$_{8}O^{-2}$, $_{8}O^{+2}$, $_{8}O$
(arrange according to the first ionization potential)
Li
Be
B
C
N
O
F
Ne
Na
Mg
Al
Si
P
S
Cl
Ar



A representative element located in the fourth period and group 7A find its atomic number


prove that Aluminum forming an amphoteric oxide
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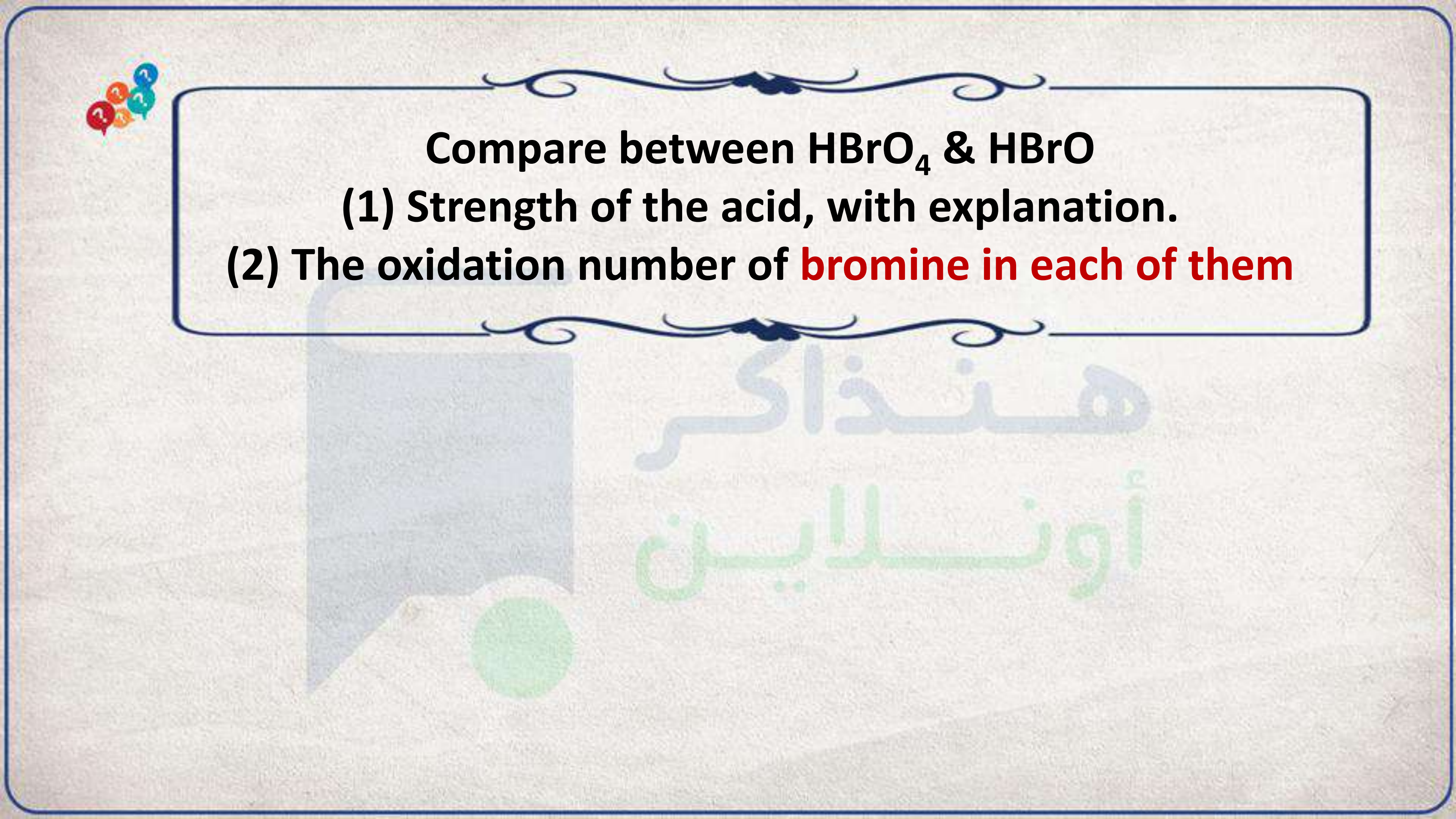

An element contain 3 main levels and 5 valence electrons, find its atomic number



(X) is an element , the 4 Quantum no of the last electron is (2 , 1 , 0 , ½)

When it bind with oxygen it forms ………… Oxide

(prove your answer with equation)



Compare between $HBrO_4$ & HBrO
(1) Strength of the acid, with explanation.
(2) The oxidation number of bromine in each of them





كيفية طباعة صفحات معينة من ملف معين

مثلا ازاى نطبع الصفحات من صفحة 4 الى صفحة 9

خطوة 1

خطوة 2 اختيار اسم الطابعة بتاعتك

خطوة 3 كتابة الصفحات المراد طباعتها نكتب رقم 4 ثم نكتب الشرطة دي – ثم نكتب 9

خطوة 4 اختيار نوع الورق

خطوة 5 اختيار A4

خطوة 6

المراجعة رقم (2)









Chapter 1 (Atomic structure)

1- Scientist who didn't postulate that matter is composed of atoms is …………..

○	a- Greek philosopher.
○	b- Dalton.
●	c- Aristotle.
○	d- Bohr.

2- All of the following postulates are from Dalton's theory , except …………………………

●	a- Atoms of elements are composed of protons , neutrons and electrons.
○	b- The masses of the atoms of the same element are similar.
○	c- Atom can not be divided.
○	d- Each element is composed of tiny particles which are called atoms.

3- Which example agrees with Dalton's postulates?

○	a- Atoms found in the sample of chlorine are similar to atoms found in sample of sulphur.
○	b- The properties of the molecules of hydrogen and oxygen differ from their properties in water molecules .
○	c- Hydrogen can combine with oxygen to form water in more than one ratio.
●	d- Atoms of magnisium are tiny.

4- In the electric discharge experiments , cathode rays deflect away from the metallic plate which is negatively charged , because they are…………………

○	a- Not material particles.
○	b- Positively charged .
●	c- Negatively charged.
○	d- Emitted from all bodies.

5- All of the following are among the properties of cathode rays , except …………………………

○	a- Stream of electrons.
○	b- Charged particles.
●	c- Moves at the speed of light.
○	d- Deflect with the effect of a magnetic field.

6- Cathode rays …………………………

○	a- Have mass only.
○	b- Charged only.
○	c- Do not have either mass or charge.
●	d- Have mass and charge.

7- Rutherford's model of atom…………………………

○	a- Is the recently accepted model of atom.
○	b- Assumed that the atom is solid.
○	c- Explained the unique atomic spectrum of the different elements.
●	d- Assumed that the charge of the electrons equals the charge of the nucleus .

8- Rutherford' laboratory experiment proved that…………………..

●	a- Protons are not uniformaly distributed inside the nucleus.
○	b- Electrons are negatively charged particles.
○	c- Electrons are positively charged particles.
○	d- The atom contains protons , neutrons and electrons.

9- The failure of the atomic model of Rutherford is attributed to that is did not explain………………

●	a- The nature of the movement of the electrons around the nucleus.
○	b- The presence of a nucleus in the atom .
○	c- The presence of attraction forces between the protons and the electrons.
○	d- The presence of a space between the nucleus and the electrons.

10- Which of the following statements is incorrect?

●	a- The line spectrum of hydrogen atom is formed of four inseparable colours .
○	b- Electrons have dual nature.
○	c- Bohr's atomic model introduced the concept of quantum to determine the energy of the electrons .
○	d- In case of not gaining or losing energy , the atom is described to be stable.

11- On approaching one of lithium salts to the non-luminous region of bunsen flame , it is coloured red , this is explained by that the electrons in the excited atoms of lithium…………………………

○	a- Are lost from the atoms.
○	b- Their number increases.
●	c- Return to the ground state.
○	d- Transfer to higher levels.

12- Bohr's atomic model…………………………

○	a- Suggested that the electron occupies a definite energy level only.
○	b- Explained the line spectrum of hydrogen atom only.
○	c- Predicted the different energy levels in different multi-electron atoms.
●	d- (a) and (b) together.

13- When a photon of light with wavelength 486 nm transfers from an electron in the principal level (n=4) in hydrogen atom , this electron transfers to the principal level…………………………

○	a- n=1.
●	b- n=2.
○	c- n=3.
○	d- n=5.

14- The line spectrum of hydrogen atom consists of four coloured lines , which of them has the smaller frequency?

○	a- green
○	b- blue.
●	c- red.
○	d- violet.

15- Among the postulates of Bohr's atomic model is…………………………

○	a- Electrons can acquire any amount of energy .
○	b- It is impossible to determine the path of the electron precisely.
●	c- The energy of the electrons in different energy levels are determined through the concept of quantum.
○	d- (a) and (c) together.

16- Which of the following statements does not agree with the postulates of Bohr's atomic model?

○	a- The concept of quantum is introduced.
○	b- The electron which is nearest to the nucleus is the lowest in energy.
○	c- Electrons revolve around the nucleus in different orbits.
●	d- It is impossible to determine the position and the speed of the electron together precisely.

17- On comparing the position of the electron in its ground state , with its position in the excited state , it is ………………………..

○	a- In the second energy level.
○	b- In the nucleus .
●	c- Closer to the nucleus.
○	d- Farther from the nucleus.

18- Each of the following is among the properties of the electrons , except that is …………………………

○	a- A material particle.
○	b- Has wave properties.
●	c- Loses energy when it transfers from one energy level to another.
○	d- Deflect by the effect of a magnetic field.

19- The electron which is excited to the fourth energy level …………………………

○	a- Remains in the same new energy level.
●	b- Returns to its ground state in one jump.
○	c- Returns to its ground state in one jump or several jumps.
○	d- Transfers to a higher energy level .

20- "The actual path of the last electron in iron atom can not be precisely determined" . the previous statement is an application of …………………………

○	a- Hund's rule.
○	b- Bohr's base.
●	c- Uncertainty priciple.
○	d- The dual nature of electron.

21- What is(are) the quantum number(s) whose value(s) never be zero?

○	a- Principal.
○	b- Subsidiary.
○	c- Spin.
●	d- (a) and (c) together.

22- What is the quantum number whose value never be zero or not an integral number?

○	a- Principal.
○	b- Subsidiary.
○	c- Magnetic.
●	d- Spin.

23- Which of the following quantum numbers values represent an electron in one of the orbitals of 3p sublevel?

○	a- n=3 , l=2 , m_l=-1.
○	b- n=3 , l=0 , m_l=0.
●	c- n=3 , l=1 , m_l=0.
○	d- n=3 , l=0 , m_l=+1.

24- What is the largest number of electrons can be found in the same atom and have the two quantum numbers (n=4 , l=1) ?

○	a- 2.
●	b- 6.
○	c- 8.
○	d- 10.

25- The electrons of 5d sublevel in one of the atoms can not have the magnetic quantum number……..

○	a- +1.
○	b- -1.
○	c- +2.
●	d- +3.

26- The electron which has the four quantum numbers : (n=4 , l=3 , ml=+2 , ms=+1/2) is found in the sublevel ………………

○	a- 3d.
●	b- 4f.
○	c- 5p.
○	d- 6s.

27- The electrons which are found in the energy level K……………………

○	a- Have the same quantum number (n) only.
○	b- Have the same quantum number (l) only.
○	c- Have the same quantum number (ml) only.
●	d- All the previous.

28- Electron (X) has the following quantum numbers : (n=3 , l=2 , ml=-1 , ms=-1/2) , what are the quantum numbers of the electron (Y) which has the same energy of the electron (X) , but it differs from the electron (X) in the spinning motion? respictively

●	a- 3 , 2 , -1 , +1/2.
○	b- 3 , 1 , -1 , -1/2.
○	c- 3 , 2 , 0 , +1/2.
○	d- 2 , 1 , 0 , +1/2.

29- Which of the following quantum numbers includes a mistake?

○	a- n=2 , l=1 , m_l=+1.
○	b- n=4 , l=2 , m_l=+1.
●	c- n=3 , l=3 , m_l=-2.
○	d- n=3 , l=0 , m_l=0.

30- Which of the following quantum numbers don't includes a mistake?

●	a- n=5 , l=3 , m_l=-3.
○	b- n=3 , l=1 , m_l=-2.
○	c- n=4 , l=0 , m_l=+1.
○	d- n=3 , l=2 , m_l=-3.

31- The two electrons which have the same l , ms values , are located in the same ………………

●	a- Sublevel but not necessarily in the same principal level.
○	b- Principal level but in two different sublevels.
○	c- Orbital.
○	d- Principal level but in different orbitals.

32- Which of the following statements is correct?

○	a- It is possible to determine the position and the speed of the electron together precisely at the same time .
○	b- The sizes of the orbitals of the same atom are similar
○	c- The electron can be found in the spaces between the energy levels.
●	d- The two electrons of helium don't have the same four quantum numbers .

33- Which of the following represents the possible quantum numbers of the last electron in nitrogen atom ?

●	a- n=2 , l=1 , m_l=+1 , ms=+1/2.
○	b- n=2 , l=1 , m_l=+1 , ms=-1/2.
○	c- n=2 , l=1 , m_l=-1 , ms=+1/2.
○	d- n=2 , l=1 , m_l=-1, ms=-1/2.

34- Which is easier , losing an electron from 3d or from 4s ?

○	a- 4s is more easy as it is closer to the nucleus than 3d.
○	b- 4s is less easy as it is closer to the nucleus than 3d.
●	c- 4s is more easy as it is farther from the nucleus than 3d.
○	d- 4s is less easy as it is farther from the nucleus than 3d.

35- What is the correct order of orbitals in titanium atom according to the increase of energy?

○	a- 3s < 3p < 3d < 4s .
●	b- 3s < 3p < 4s < 3d.
○	c- 3s < 4s < 3p < 4d.
○	d- 4s < 3s < 3p < 3d.

36- Which of the electrons that have the following quantum numbers has higher energy?

○	a- 3 , 2 , 1 , +1/2.
○	b- 4 , 2 , -1 , +1/2.
○	c- 4 , 1 , 0 , -1/2.
●	d- 5 , 0 , 0 , +1/2.

37- The element whose atomic number is 14 , its elctrons are distributed in ……… orbitals.

○	a- 16.
○	b- 12.
○	c- 8.
●	d- 7.

38- In iron element Fe_{26} , the number of the half filled orbitals is equal to the value of the ……. Quantum number of the last electron .

●	a- Principal.
○	b- subsidiary.
○	c- Magnetic.
○	d- Spin.

39- What is the electronic configuration which represents an excited atom?

○	a- F_9 : $1s^2$, $2s^2$, $2p^6$.
○	b- N_7 : $1s^2$, $2s^2$, $2p^3$.
●	c- Li_3 : $1s^2$, $2p^1$.
○	d- He_2 : $1s^2$.

40- Which of the following agree with Pauli's principle?

○	a- [↑↑] [↑][ ][ ]
○	b- [↑] [↑][↑↑][↑]
○	c- [↑] [↑↑][↑][ ]
●	d- [↑↓] [↑][ ][ ]

41- Orbitals of the same energy sublevel are………………

○	a- Different in energy.
●	b- Similar in energy.
○	c- Similar in enegy but different in shape.

42- When the electrons of an excited atom turn back to its original level , …………emitted .

○	a- Beta particles.
○	b- Alpha particles.
●	c- line spectra.
○	d- Cathode rays .

Chapter 2 (Modern periodic table)

1- which of the following elements is located in the same period of silicon in the modern periodic table ?

○	a- Ge_{32}.
○	b- Sc_{21}.
●	c- Na_{11}.
○	d- Sr_{38}.

2- The only noble gas that does not end with ns^2 , sp^6 is ………………………..

○	a- radon.
○	b- neon.
●	c- helium.
○	d- krypton.

3- an element with atomic number 42 , the number of its half filled orbitals is ……………

○	a- 1.
○	b- 4.
○	c- 5.
●	d- 6

4- what is the number of periods in the periodic table in which the elements from hydrogen to argon are located ?

○	a- 2.
●	b- 3.
○	c- 4.
○	d- 8.

5- the element which is located at the top right of the modern periodic table is of the …………elements.

○	a- representative.
●	b- noble.
○	c- main transition.
○	d- metallic.

6- the electronic configuration of an element is : [Xe] , $6s^2$, $4f^{14}$, $5d^7$, this element is an ……element .

●	a- main transition.
○	b- inner transition.
○	c- noble.
○	d- representative.

7- the first element in d-block elements is…………………………

○	a- Ca_{20}.
○	b- Cr_{24}.
●	c- Sc_{21}.
○	d- Cu_{29} .

8- the electronic configuration of an alkali earth metal is …………………..

○	a- [Ar] , $4s^1$, $3d^5$.
○	b- [Ar] , $4s^2$, $3d^6$.
●	c- [Rn] , $7s^2$.
○	d- [Xe] , $6s^2$, $4f^7$.

9- the electronic configuration of silver is ………………

○	a- [Ar] , $4s^2$, $4d^9$.
●	b- [Kr] , $5s^1$, $4d^{10}$.
○	c- [Kr] , $5s^2$, $3d^9$.
○	d- [Ar] , $4s^1$, $4d^{10}$.

10- Magnisium ion $_{12}^{24}Mg^{+2}$ contains…………………

●	a- 12 protons , 10 electrons .
○	b- 24 protons , 26 electrons .
○	c- 12 protons , 13 electrons .
○	d- 24 protons , 14 electrons .

11- the electronic configuration of iron(III) $_{26}Fe^{+3}$ is …………………………

○	a- [Ar] , $3d^1$, $4s^2$.
○	a- [Ar] , $3d^6$, $4s^2$.
●	a- [Ar] , $3d^5$.
○	d- [Ar] , $3d^6$.

12- the highest number of unpaired electrons is in ……………

○	a- Fe.
○	b- Fe^{+2}.
●	c- Fe^{+3}.
○	d- Fe^{+4}.

13- the atomic radius of flourine F9 is smaller than the atomic radius of carbon c6 because…….

○	a- the quantum numbers of the electrons of F are smaller than those of C.
○	b- the repulsion between the electrons of a completely filled orbitals is stronger than that between the electrons of the half filled orbitals .
●	c- the effective nuclear charge of flourine is larger than carbon.
○	d- flourine is heavier than carbon.

14- the correct arrangement of increasing the ionic radius is ………………

○	a- $Mg^{+2}<Al^{+3}<Na^{+}$
○	b- $Mg^{+2}< Na^{+}<Al^{+3}$.
●	c- $Al^{+3}<Mg^{+2}<Na^{+}$.
○	d- $Na^{+}<Mg^{+2}<Al^{+3}$.

15- in the equation : $X^0 + \text{Energy} \longrightarrow X^+ + e^-$, the absorbed energy …….. the energy of level Q.

○	a- equal to .
●	b- more than.
○	c- less than.
○	d- all of the previous.

16- the difference between the two values of first and second ionization energy is very large in case of atoms of …………..element .

○	a- Ne^{10}.
○	b- Mg^{12}.
○	c- Al^{13}.
●	d- K^{19}.

17- in the third period , on moving from sodium to argon , ………….. increase .

○	a- atomic number and atomic size.
●	b- atomic number and electronegativity .
○	c- electronegativity only .
○	d- atomic number and ionization potential .

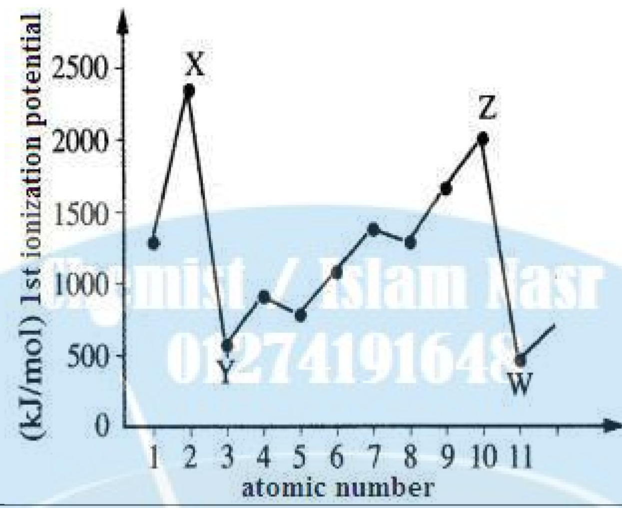
18- which of the following ions has larger radius ?

○	a- F^{-}.
○	b- Na^{+}.
●	c- O^{-2}.
○	d- Mg^{+2}.

19- which of the following information Berzelius might relied on his classification of the elements ?

○	a- atomic number of the elements.
○	b- electronic configuration of the elements.
●	c- degree of electricity and heat conductivity.
○	d- the quantum numbers of the last electron in each element.

20- which of the illustrated elements in the opposite figure has higher tendency to lose valence electrons?



○	a- X.
○	b- Y.
○	c- Z.
●	d- W.

21- Arsenic As_{33} and Antimony Sb_{51} are similar in ………………..

○	a- both of them are located in the fourth period only.
●	b- both of them are located in (5A) group only.
○	c- their electric conductivity is higher than that of metals only.
○	d- all of the previous.

22- what is the anion that forms the strongest oxygenated acid?

○	a- SO_4^{-2}.
○	b- ClO_2^{-}.
○	c- ClO_3^{-}.
●	d- ClO_4^{-}.

23- Nitrogen gas is less active than flourine gas , because …………………… .

○	a- the boiling point of nitrogen is less than that of flourine.
○	b- the molar mass of nitrogen is less than that of flourine.
●	c- the atomic radius of nitrogen is larger than that of flourine.
○	d- the electronegativity of nitrogen is higher than that of flourine.

24- PH value equals 0.2 in the strong acidic solutions like …………………………

●	a- $SO_2(OH)_2$.
○	b- $PO(OH)_3$.
○	c- $Ca(OH)_2$.
○	d- $Al(OH)_3$.

25- Why does aluminum oxide disappear on adding a little amount of it to sodium hydroxide solution with stirring ?

○	a- because aluminum Al_{13} is located in the same period of sodium Na_{11}.
○	b- because aluminum oxide reacts as a base with sodium hydroxide.
○	c- because the basic property decreases in the same period by increasing the atomic number.
●	d- because aluminum oxide reacts as an acid with sodium hydroxide.

26- which of the following oxygenated acids is stronger?

○	a- HOCl.
○	b- HNO_2 .
○	c- H_2SO_3.
●	d- HNO_3.

27- which of the following changes an oxidation process occurs to vanadium?

○	a- $VO_2 \longrightarrow V_2O_3$.
○	b- $V_2O_5 \longrightarrow VO_2$.
○	c- $V_2O_3 \longrightarrow VO$.
●	d- $V_2O_3 \longrightarrow V_2O_5$.

28- In which of the following equations the underlined substance acts as a reducing agent?

○	a- $\underline{CaO}+H_2O \longrightarrow Ca(OH)_2$.
○	a- $\underline{CO_2}+C \longrightarrow 2CO$.
○	a- $\underline{CuO}+H_2 \longrightarrow Cu+H_2O$.
●	d- $\underline{3CO}+Fe_2O_3 \longrightarrow 2Fe+3CO_2$.

29- Which of the following elements is easier to be oxidized ……………

○	a- Sulphur.
●	b- Magnesium.
○	c- Boron.
○	d- Argon.

30- which of the following elements includes nonmetal , metal and metalliod…………

○	a- H , Zn , I.
○	b- Zn , I , Br.
○	c- Zn , Cu , Si.
●	d- I , Zn , Si.

31- when element X reacts with oxygen , it produces the oxide XO . when this oxide dissolves in water , it produces solution which is coloured blue by adding drops of sunflower stain?

○	a- Na.
●	b- Ba.
○	c- S.
○	d- N.

32- what is the formula of oxide of the element M , which is located in 3A group in the periodic table?

●	a- M_2O_3 .
○	b- M_3O_2.
○	c- MO.
○	d- M_3O_4.

33- when NO_2 reacts and is converted to N_2O_4 , the oxidation number of nitrogen……………..

○	a- increases by 2.
○	b- increases by 4.
○	c- increases by 8.
●	d- does not change.

34- in which of the following coversions the oxidation number of nitrogen doesn't change ?

○	a- $NO_3^- \longrightarrow NO$.
○	b- $N_2O_4 \longrightarrow NO_3$.
●	c- $NH_3 \longrightarrow (NH_4)^+$.
○	d- $NO_2 \longrightarrow N_2O_5$.

35- what it is the oxidation number of phosphorus in perphosphate ion $(P_2O_7)^{-4}$?

○	a- +10.
○	b- +7.
○	c- +3.5.
●	d- +5.

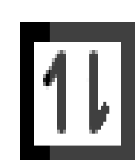
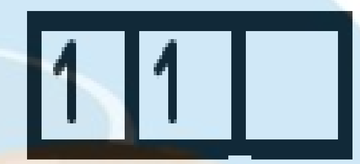
36- which of the following oxides when its mixture dissolves in water , it yields a neutral solution?

●	a- Al_2O_3 , MgO.
○	b- Na_2O , MgO.
○	c- Na_2O , P_4O_{10}.
○	d- SO_3 , P_4O_{10}.

Essay questions

1- How we can convert iron metal to gold , due to Aristotle concept?

2- Explain the extent of agreement of both Pauli exlusion priciple and Hund's rule on the following :

3- $Y^{+}_{(g)}$ + Energy $\longrightarrow$ $Y^{++}_{(g)} + \bar{e}$

a- what does the energy represent in the previous equation?

b- which is larger in radius Y^{+} or Y^{++} . Why?

4- determine the oxidizing and reducing agent in the following reaction:

$$2H_2S + SO_2 \longrightarrow 2H_2O + S$$

5- Calculate the oxidation number of Zinc in (sodium zincate)?

6- why does Caesium hydroxide ionized as base , and $ClO_3(OH)$ as acid?

Best wishes,

Mr/ Islam Nasr

01274191648

مجانا وحصريا

حمل الان

امتحانات رقم (1)







دليل استرشادي كيمياء انجليزي

1- Elements of the same group, the values of their atomic radii measured by Angstrom as the following

A	B	C	D
1.96	2.27	1.52	2.48

Which of the following is correct?

a) The element (A) has smaller electronegativity than the element (B)
b) The element (D) has greater electronegativity than the element (C)
c) The element (C) has smaller electron affinity than the element (A)
d) The element (B) has higher ionization energy than the element (D)

2 - Bohr's atomic model is distinguished from Rutherford's model in that the electrons orbit the nucleus in Bohr's model in:

a) Special orbits.
b) Definite allowed energy levels.
c) That they revolve around the nucleus.
d) That they revolve at very high speed.

3 - If the electrons gains energy equal 10.2 ev it transfer from level k to level L, to transfer the electron from level M to level L

a) It lose energy equal 1.89 ev
b) It gain energy equal 1.89 ev
c) It lose energy equal 10.2 ev
d) It gain energy equal 10.2 ev

4- If the Second ionization energy and Third ionization energy of an element as shown in the following equations

$X^{+} \rightarrow X^{2+} + e^{-}$ $\Delta H = +495$ kj / mol.

$X^{2+} \rightarrow X^{3+} + e-$ $\Delta H = +4560$ kj / mol

This element is characterized from the previous elements in its same period by

a) Non - metal has low ionization energy
b) Metal has low ionization energy
c) Non -metal has high ionization energy
d) Metal has high ionization energy

5- X and Y are two elements are located in the same period

their atomic radii X = 0.157 A0 , Y = 1.04 A0

When the two elements are combine together ……..

a) X is oxidized while Y is reduced
b) Both of X and Y are reduced
c) X is reduced while Y is oxidized
d) d)Both of X and Y are oxidized

6 -The modern atomic theory modified the inadequecy in Bohr's atomic model by

a) The electron has wave property only
b) The electron is negative material particle only
c) The electron orbits the nucleus in electron cloud
d) The electron has a dual nature

7- By using the following table

Atom or ion	Electronic configuration
A^{-1}	$[_{10}Ne]$
B^{-2}	$[_{10}Ne]$
C	$[_{18}Ar]\ 4s^1$
D	$[_{10}Ne]\ 3s^1$

The arrangement of elements according to the electronegativity is

a) A > B > D > C
b) D < A < C < B
c) D > C > B > A
d) A > D > C > B

8 -Each of hydrogen and helium atoms contain one energy level""

In the light of the previous statement, which of the following is correct:

a) They differ in the atomic emission spectrum.
b) They are equal in number of electrons.
c) They differ in the principal quantum number.
d) They are similar in the atomic emission spectrum.

9- By the application of the wave equation on the last electron of sodium atom $_{11}Na$

a) It is possible to determine its position accuretly in the level M
b) It moves nearer and farther from the nucleus in the level M
c) Its energy is less than the energy of the electrons in the L level
d) The electron transferes to the level L by losing quantum of energy

10 -To get visible spectrum of the hydrogen atom of electron exited at the third energy level (M) must

a) The electron lose energy less than energy gain
b) The electron lose energy more than energy gain
c) The electron gain a quantum of energy
d) The electron lose energy same than energy gain

11 **-An element X its electron configuration ends by $3p^1$, then with respect to the elements that precede it in the period, this element is:**

a) A non-metallic element and its electron affinity is high.
b) A non-metallic element and its electron affinity is low.
c) A metallic element and its electron affinity is high.
d) A metallic element and its electron affinity is low.

12- An element (X) its electronic configuration ends by the following sublevels $5s^2\ 4d^{10}\ 5p^5$

The properties of this element with the respect to the elements before it in its period

a) Its oxide is basic and its ionization potential is small
b) Its oxide is amphoteric and its ionization potential is high
c) Its oxide is acidic and its ionization potential is high
d) Its oxide is acidic and its ionization potential is small



كيفية طباعة صفحات معينة من ملف معين



مثلا ازاى نطبع الصفحات من صفحة 4 الى صفحة 9

خطوة 1

خطوة 2
اختيار اسم الطابعة بتاعتك

خطوة 3
كتابة الصفحات المراد طباعتها
نكتب رقم 4 ثم نكتب الشرطة دي – ثم نكتب 9

خطوة 4
اختيار نوع الورق

خطوة 5
اختيار A4

خطوة 6